The Birdlife of Britain

Peter Hayman
Philip Burton

A dramatic new way of identifying and understanding the birds of Britain and Europe

Produced in association with The Royal Society for the Protection of Birds

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in association with
The Royal Society for the Protection of Birds RSPB

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A dramatic new way of identifying and understanding the birds of Britain and Europe

We made this book because conventional field guides fail to understand the true needs of bird-watchers. Those earlier guides seem to concentrate on plumage, as if that were the exclusive clue to recognizing birds. But there is more to birds than feathers—and our book is, therefore, about birds in action, the way people really see them. That freedom of action is, after all, what makes aerial creatures so uniquely engrossing to watch.

For one thing, it brings them into our daily lives more than any other wild creatures. From an office window in any city centre there are Grey Wagtails to be seen on nearby roofs, or Kestrels circling church steeples. A Londoner may, with luck, see a Cuckoo over Oxford Street, and there are Tawny Owls in suburban trees. Grey Herons commute between parks. Feral Pigeons have been known to accompany commuters down the escalator to underground trains. It is not impossible for a Peregrine, the ultimate falcon, to appear over a railway terminus.

The Birdlife of Britain has been designed to give both beginner and expert the chance to develop and expand the pleasure of recognizing birds. While providing the uninitiated with the key to identification by behaviour, for the expert it illustrates an enormous range of plumage variations.

The same thinking has governed our choice of birds to be included in the book. Quite simply, they are the species which anyone is likely to see during a lifetime in Britain and Europe. Some are rare in the sense that their range is limited, but birds are excluded if in the ordinary course of events they are unlikely ever to be seen.

Moreover, the species are grouped together according to their resemblance to one another, rather than being forced into a taxonomic, or scientific, order. Again, this was done with the real needs of the observer in mind. A Hedge Sparrow and a House Sparrow look similar but belong to different families. In a conventional field guide the two species are invariably separated by scores of pages. In this book they occur within three pages of each other. There is, however, a checklist of the common names of the birds against their scientific (latin) names, and this is based on Charles Vaurie's *The Birds of the Palaearctic Fauna*.

Phonetic renderings of bird sounds are notoriously meaningless to the uninitiated. Who can tell what "dweeje" sounds like in the wild? In order to eliminate this source of confusion, phonetic renderings are confined to the familiar (eg "cuc-coo") or to cases where they are an essential clue to a bird's identity.

The Birdlife of Britain has also broken new ground in accurate illustration. Every main illustration of every bird was painted either from a dead specimen or a skin—a stuffed bird. On average it required 38 separate measurements with scale dividers to construct the basic outline.

The specimens themselves came from a number of sources. One was the artist's own deep-frozen collection. Another was the national collection at the British Museum (Natural History) Sub-department of Ornithology at Tring, Hertfordshire. The museum's contribution to the book as a whole, including the personal assistance of Peter Colston and Derek Read, has been invaluable.

Planning the book would have been more difficult without the help of Dr J J M Flegg, until December 1975 Director of the British Trust for Ornithology. In addition, several members of the staff of the BTO generously helped the artist with additional specimens and with advice. They were Bob Spencer, Howard Ginn, Bob Hudson, Chris Mead and Tony Prater.

Peter Conder, until December 1975 Director of the Royal Society for the Protection of Birds, and Nick Hammond, Head of Publications at the RSPB, have been valued colleagues throughout their association with the book.

Most long-standing of all the artist's debts is to Cliff White, who nearly 30 years ago helped him to acquire the techniques of accurate observation and evaluation.

Both of us have arrears of gratitude to the publishers. Creating *The Birdlife of Britain* required skill and enthusiasm beyond our own, and we would like to thank studio, proof-readers, designers, production staff and particularly the editor and senior editor for having both in abundance.

Peter Hayman.

Philip Burton

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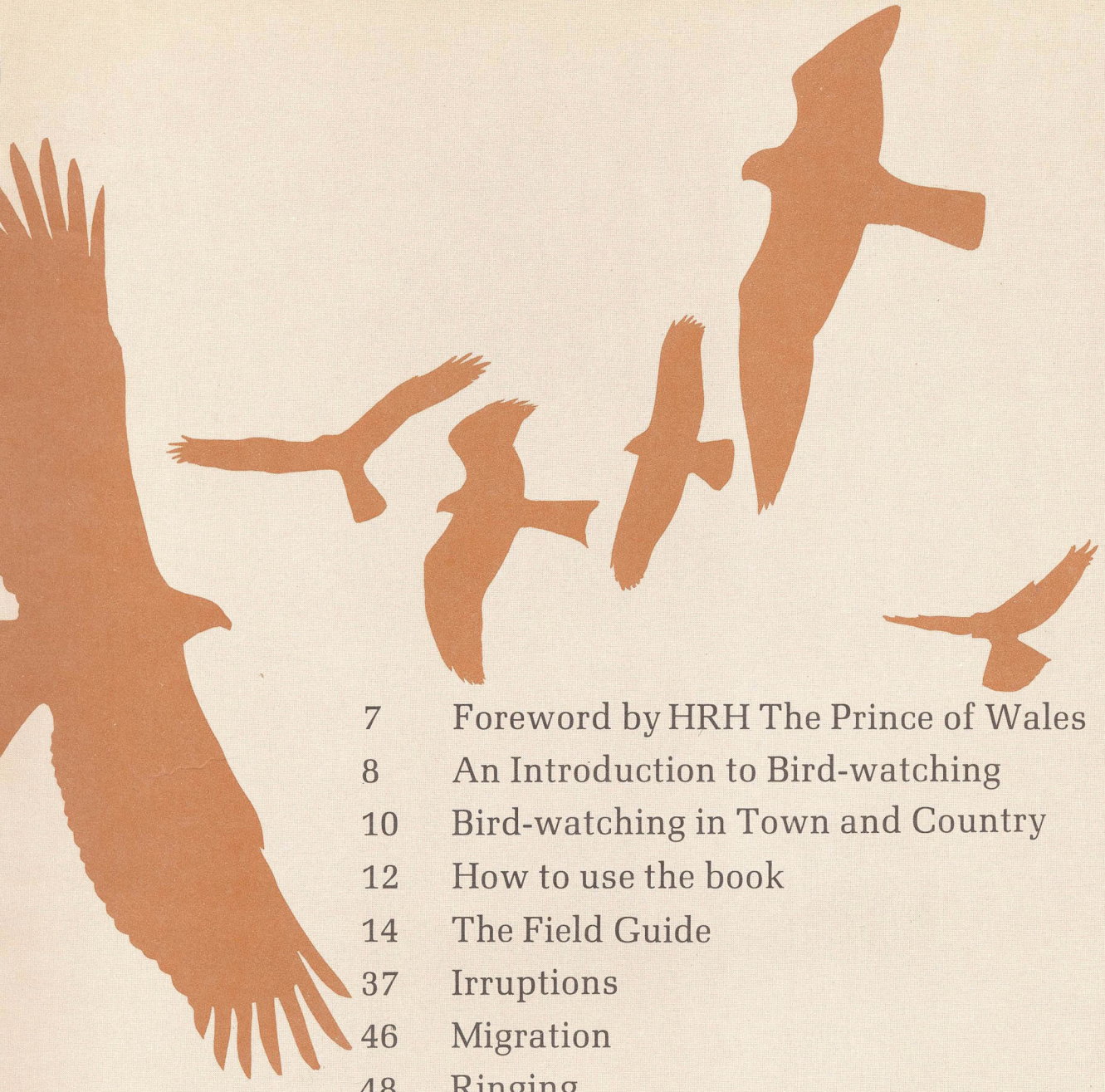

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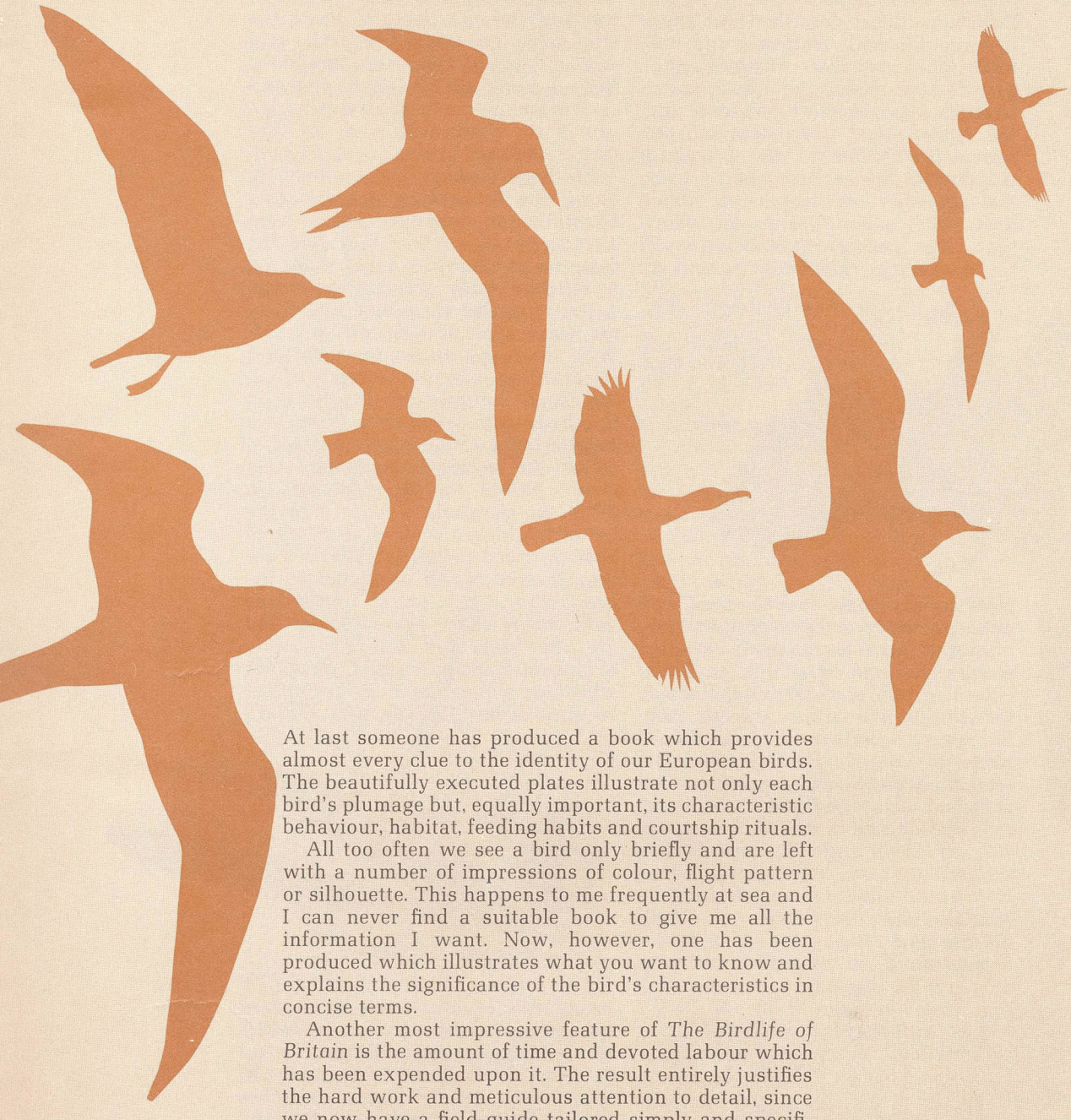


At last someone has produced a book which provides almost every clue to the identity of our European birds. The beautifully executed plates illustrate not only each bird's plumage but, equally important, its characteristic behaviour, habitat, feeding habits and courtship rituals.

All too often we see a bird only briefly and are left with a number of impressions of colour, flight pattern or silhouette. This happens to me frequently at sea and I can never find a suitable book to give me all the information I want. Now, however, one has been produced which illustrates what you want to know and explains the significance of the bird's characteristics in concise terms.

Another most impressive feature of *The Birdlife of Britain* is the amount of time and devoted labour which has been expended upon it. The result entirely justifies the hard work and meticulous attention to detail, since we now have a field guide tailored simply and specifically to the needs of the ornithological layman. With this book, the Pomarine Skua is as likely to be correctly identified as is the more familiar Arctic Skua, while the Whimbrel should no longer be confused with the Curlew.

In the same way that I now never go diving in tropical seas without my plastic underwater book of fish recognition, I shall make sure that this marvellous book accompanies me at all times—on the bridge of my ship and in the front of my car.

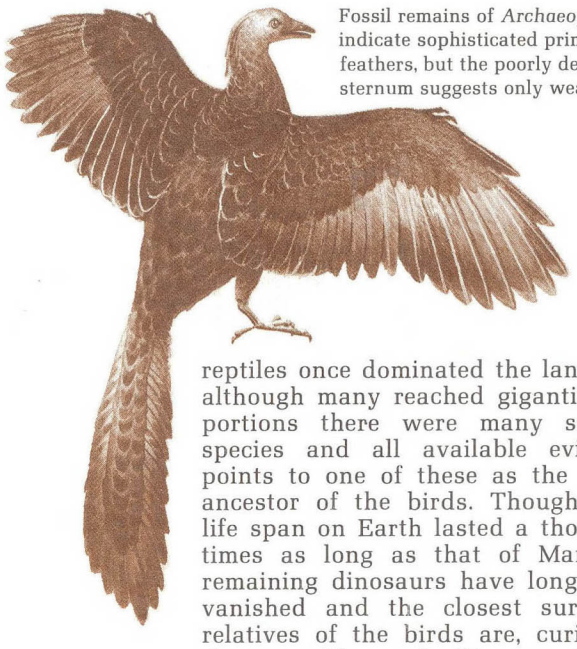
Charles

An Introduction to Bird-watching

Dr Philip Burton

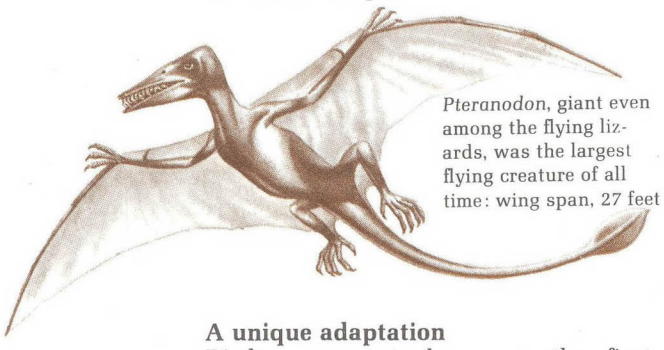
Reptiles with feathers

Birds have been described as "glorified reptiles with feathers" and certainly their reptilian ancestry, suggested even today by their scale-covered legs, is more obvious and far more recent than that of the mammals. Studies of the fossilized remains of the earliest known bird, the crow-sized *Archaeopteryx* which lived 130 million years ago, show that birds are the close relatives of the dinosaurs. This extinct group of



Fossil remains of *Archaeopteryx* indicate sophisticated primary feathers, but the poorly developed sternum suggests only weak flight

reptiles once dominated the land, but although many reached gigantic proportions there were many smaller species and all available evidence points to one of these as the direct ancestor of the birds. Though their life span on Earth lasted a thousand times as long as that of Man, the remaining dinosaurs have long since vanished and the closest surviving relatives of the birds are, curiously, the crocodiles and alligators. Nevertheless, birds are rightly grouped in a separate class of vertebrates, or animals with backbones, for their far-reaching adaptations have transformed them into the most vibrantly alive of all creatures—so successful that they have spread to every part of the Earth's surface and have colonized virtually every habitat save for the ocean deeps.

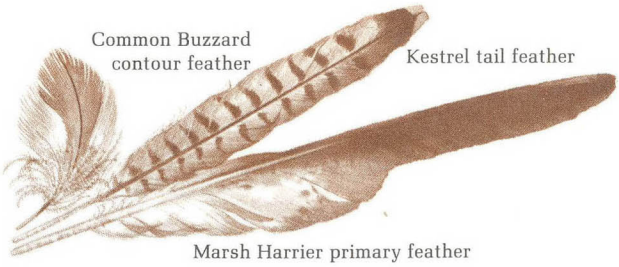


Pteranodon, giant even among the flying lizards, was the largest flying creature of all time: wing span, 27 feet

A unique adaptation

Birds were not, however, the first group of flying creatures to arise from reptilian stock. Long-extinct pterosaurs—the "flying lizards"—had remarkable powers of flight on membranous wings tautly stretched between the fore- and hind-limbs. But with the development of feathers, their one truly unique feature, the birds were able to evolve versatile and efficient wings from the fore-limbs alone, leaving the hind-limbs free and so overcoming the most serious handicap of the pterosaurs, and, for that matter, the bats.

Feathers evolved before flight in birds, very probably as a heat-saving adaptation in ancestors which were already so active that they had become warm-blooded—that is, achieved a constant body temperature mechanism rendering them independent of the temperature of their surroundings. With this came an improvement and streamlining of the circulation in which the blood supply from the heart to the body was simplified from two huge arteries to a single main vessel called the aorta. Interestingly, this vessel passes to the right side in birds; in mammals it passes to the left of the body's centre-line. Feathers have provided the birds with far more than insulation and sophisticated flying ability: they show tremendous variation of shape and of colour and are the basis for the rich variety of plumages, and patterns of behaviour, which are among the most fascinating features of birdlife. The male Robin's



bright red breast is his symbol of strength and authority when defending his territory against all-comers; the dappled plumage of the Nightjar enables it to remain almost invisible against its background; and the soft-edged feathers of the Barn Owl's wings are the key to its almost silent flight.

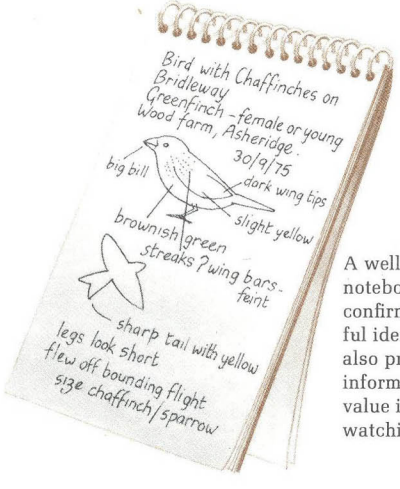
The fascination of birdlife

The ability to fly is, of course, of enormous value in evading danger from predators, and today flightless birds survive almost entirely on remote islands having no resident predators. For this reason, birds are generally able to pursue their activities in broad daylight, in full view of the observer, and here lies the key to their great popularity. Although mammals are equally varied and interesting in their behaviour, they are secretive and often nocturnal in habit and their study

will most probably remain a specialist activity. By contrast, birds can be observed and enjoyed anywhere and this book has been designed to increase that enjoyment for beginner and expert alike.

The techniques of bird-watching

Simple identification of living birds is the starting point for all the many and varied activities that bird-watchers pursue. It may become an absorbing end in itself, or it may lead on to different, sometimes more specialized, areas of interest. Either way it is important at the outset to learn the basic techniques of bird observation. The way to make the best use of this field guide is explained in the following pages, but it should be realized that some species always cause difficulties—even to the most experienced observer.



A well-kept observer's notebook allows later confirmation of doubtful identifications and also provides a fund of information of great value in planning bird-watching trips

The pitfalls are generally of two kinds; either the observer "sees" features that are not really there or fails to pick out features that are. The first often happens when only a fleeting glimpse is seen of the bird—and the errors are usually exaggerated when attempts are made to recollect details later. Seeing what is there is a matter of practice and self-discipline; assuming that you have a clear view, try to combine a part-by-part description—colour, pattern, size, shape of wing and so on—with a good overall impression of the bird. If in flight, note the style of flight, where the bird appeared from, where and how it landed, and what it did after landing. Birds are not identified purely by plumage pattern but by a combination of physical appearance, song or call, flight pattern and behaviour—all of which are clues to what the Americans call the "gizz" of the bird, the combinations of form and behaviour that make up the individual "personality" of the species.

Recording what you see

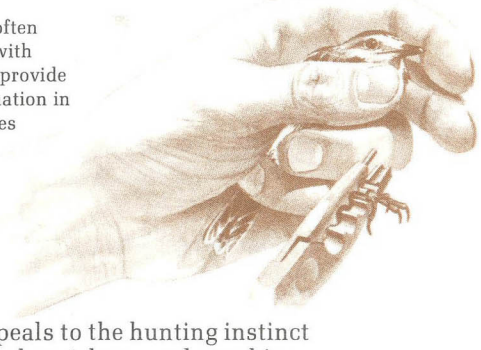
Right from the start it is advisable to adopt the habit of recording your observations; if on-the-spot identification is not possible, a simple outline sketch of major features, plus notes on where and under what conditions the bird was seen, will enable you to check the bird's identity at a more convenient time. Moreover, the bird-watcher's diary you build up over the years will provide a fascinating account of the changing aspects of bird activities throughout the seasons. Be very careful in estimating size, it is one of the most common areas of error; wherever possible, compare the bird with others of known size near by.

A developing interest

As your knowledge and interest grows you will aim to see more and more of the birds described in this book, and to do so will entail visiting a variety of habitats at different times of the year. If possible, make some of these visits with an experienced bird-watcher, or join a local bird-watching society—most of which organize visits to areas of interest, often led by guides whose detailed knowledge of the area is invaluable to the beginner.

Many observers become attracted to more serious studies of behaviour, populations or migrations and it is worth remembering that, although professional ornithologists have special facilities for certain types of study, there is ample scope for valuable work to be done by amateurs. Ringing programmes are organized in many of the European countries and, for those with the time to spare, and the enthusiasm, the effort is well rewarded.

Bird-ringing programmes, often implemented with amateur help, provide the key information in research studies



Ringing appeals to the hunting instinct in many bird-watchers and combines the excitement of a field sport with the opportunity to learn more about the lives and movements of birds. Counts of birds are often of great value in formulating long-term policies for their protection and conservation, and such research programmes always require the combined efforts of amateurs and professionals, often in many different countries.

Bird-watching in Town and Country

Garden sanctuaries

While holidays and country visits undoubtedly provide marvellous opportunities for observing birdlife, even the smallest urban garden may attract a host of avian visitors, given a little assistance, and city parks and formal gardens may often attract a surprising number of species.

The simplest way to attract birds into the garden is to provide them with food—the greater the variety of feeding material, the more species will be attracted. Hanging feeders are popular with tits, Greenfinches and Siskins, but spiral feeders should be avoided as they can trap birds by their legs. Flat-topped feeding tables are essential for Robins, Chaffinches and thrushes, while sparrows and Dunnocks usually feed most happily on the ground.

Suitable foods include sunflower and other seeds, nuts, flat-worms and mealworms, bacon rind and meat scraps. Bird tables should be cleaned and repositioned regularly to reduce the danger of bird diseases caused, and spread, by birds feeding under unhygienic conditions.

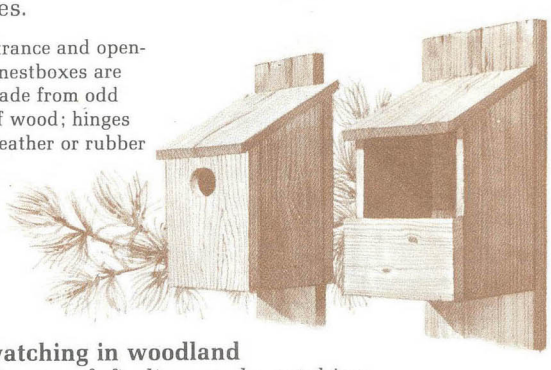
Birds may be encouraged to feed in gardens when berry-bearing bushes are planted and where seed-heads of flowering plants are left in place after the flowers have died

1 Hawthorn, 2 Holly, 3 Sunflower, 4 Berberis, 5 Cotoneaster, 6 Michaelmas Daisy, 7 Chickweed, 8 Dock, 9 Groundsel

Encouraging birds to breed

During the breeding season, a number of species may be encouraged to use nestboxes in the garden. These may be purchased or constructed easily in the home. The commonest type, ideal for members of the tit family, has a small circular entrance about 28mm in diameter; open-fronted nestboxes attract Robins and Pied Wagtails; larger boxes may be constructed for Treecreepers, while in larger gardens more specialized boxes may attract owls, doves, Jackdaws or woodpeckers. Details of the correct size, shape, entrance type and most favourable siting of nestboxes for different species is readily available from most national and local ornithological societies.

Hole-entrance and open-fronted nestboxes are easily made from odd pieces of wood; hinges may be leather or rubber



Bird-watching in woodland

Techniques of finding and watching birds in woodland vary according to the time of year. In the breeding season, the golden rule is to move about as little as possible—find a favourable spot and remain still; you will cause little disturbance and will see the birds acting quite naturally—displaying, building their nests, perhaps even feeding their young. Songs and calls will reveal the presence of many species, but give consideration to alarm calls. These are usually simple, sharp, penetrating calls—quite unmistakable even to the beginner—and if close may indicate that you are near a nest. In this case move away quietly; to remain may cause the parent bird to desert the nest, leaving the young to starve or fall prey to the predatory activities of a fox or a marauding Crow.

The changing seasons

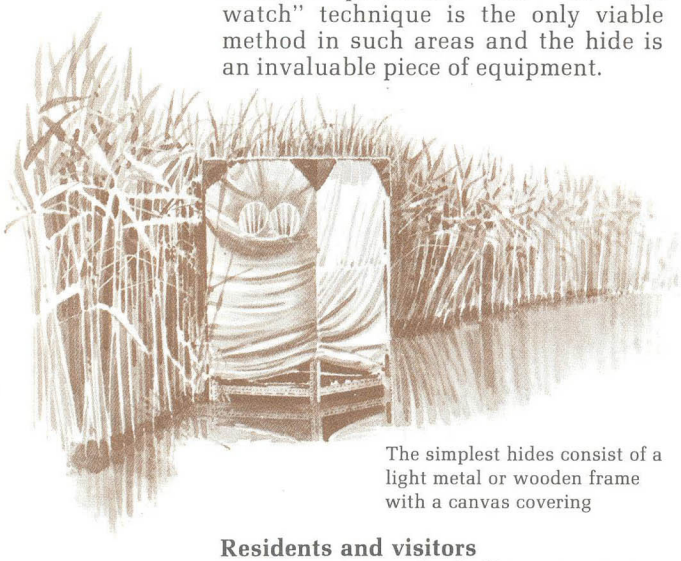
As the breeding season ends, habits change. Parties of adults with young roam the woodland or neighbouring hedgerows, venturing far from their original nesting area. In late summer many birds will be moulting in preparation for migration and may become very difficult to locate. Pied Flycatchers, for example, seem almost to vanish at this time—but are probably feeding unobtrusively at the top of the woodland canopy.

As autumn progresses, the migrants leave and winter visitors may arrive. The techniques of finding birds may now become quite different. Birds will be patchily distributed, often in roving parties, and the observer may have to walk much farther to find what the wood has to offer. Look out for fallen fruit or nuts; fallen apples are attractive to Fieldfares and Redwings feeding in nearby fields; cherries to Hawfinches, whose powerful bills can tackle the hard stones of the fruit.

During winter, many birds such as finches and thrushes feed in flocks

and roost together. These birds may be found in large numbers, roosting in thickets of evergreen laurel and rhododendron in woodland glades or along the margins of the wood.

Inland waters and marshland
Lakes, canals, rivers, reservoirs, sewage farms and gravel pits provide, in varying proportions, three main types of habitat—open water, waterside vegetation and exposed areas of shingle and mud. During the breeding season, waterside reed-beds, often with scattered willows, provide the main focus of activity, but this may be one of the most frustrating of all habitats for the bird-watcher: not only does it provide excellent cover for resident birdlife but it is also "out of bounds" to the observer. Boggy areas are dangerous to traverse, but, more important, it is impossible to do so without crushing vegetation, perhaps damaging nests or exposing the birds to the attentions of bird and mammal predators. The "sit and watch" technique is the only viable method in such areas and the hide is an invaluable piece of equipment.



The simplest hides consist of a light metal or wooden frame with a canvas covering

Residents and visitors
Though shy and skulking in habit, many reed-bed residents betray their presence with their loud songs and calls and the patient observer may be amply rewarded by some memorable sights—the nest-building mastery of the Reed Warbler, the camouflage of the Bittern, or the silent, deadly reed-skimming flight of the Marsh Harrier.

During migration periods, especially in autumn, open water and mud become areas of intense interest to bird-watchers. Waders of many species appear in large numbers as they pause in their journeys to feed and rest, while stretches of open water may be visited by gulls and terns passing through. In winter large flocks of ducks and geese will be the major point of interest and the fortunate observer may also see grebes.

Birds of the cliff and shore
Breeding waders and terns are found on flat coastlines, especially on banks of sand or shingle exposed at high tide. They are fascinating birds to watch, but their superbly camouflaged eggs, laid in a simple scrape, are vulnerable to careless feet and due notice must be taken of the alarm calls of adults. Similarly, cliff-nesting species such as Guillemots may panic if disturbed, knocking eggs from their precarious ledges or leaving them exposed to prowling gulls.

Many shore-nesting birds have superbly camouflaged eggs: those of the Little Tern, illustrated, being barely visible against the background of the nest scrape

The parade of seabirds
Outside the breeding season, visits to coast or estuary provide some of the most varied and popular bird-watching. During spring and autumn at favourable localities you may be able to observe the passage of seabirds throughout the day—shearwaters, ducks, Gannets and terns—the latter occasionally pursued by a skua. Many of these species fly close to the water surface making a high vantage point and either telescope or binoculars almost essential.

Some coastal headlands are also ports of call for migrant land-birds, and in areas of special interest observatories have been set up for the recording and study of migration. Pioneered at the turn of the century, there are now many such bases around the coasts of Europe, and for those who become interested in bird-ringing and its associated population and movement studies they are among the most interesting places to visit.

Waders and wildfowl
Muddy coasts and estuaries are not the easiest places in which to watch birds—but they are certainly the best, particularly if a hide is used. Extremely low tides should be avoided as the birds will be widely scattered; your visit should be timed to coincide with the high tide, when the birds are busily feeding on the mudbanks. You may also find wader roosts above the high tide line—sited on the same type of shingle banks as those used by breeding Ringed Plovers at earlier times of the year.

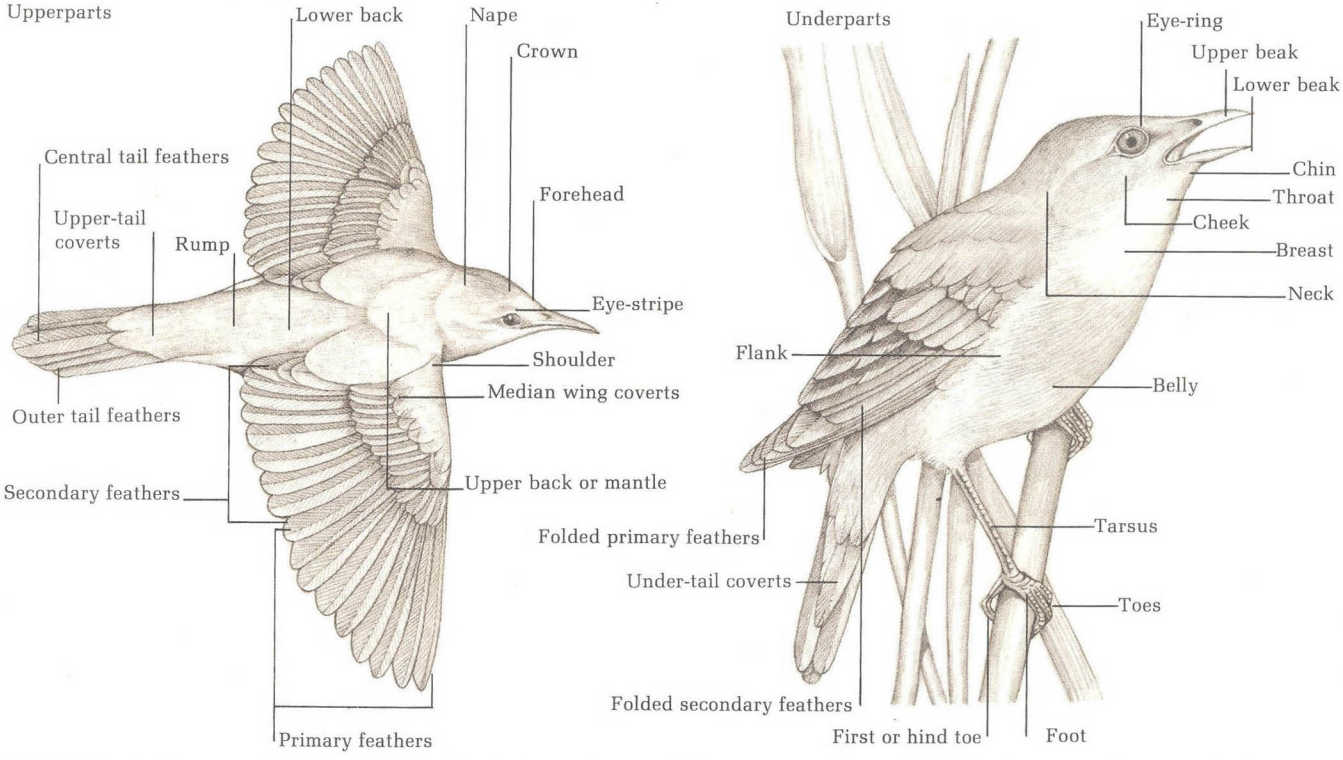
How to use the book

Even experts rarely identify birds on plumage alone. They piece together clues, such as overall colour, habitat, season and especially behaviour when feeding, flying, displaying or flocking. Thus, a blackish bird probing a lawn for food with its beak open can only be a Starling. This book illustrates as many as possible of those essential clues for identifying birds by behaviour.

Every image, including the smallest, is designed to capture the essential character of its subject. Even facial expression—notoriously elusive—is faithfully recorded so that a Marsh Tit can be told from the almost identical Willow Tit by the look in its eye. Simply memorizing feather markings is unnecessary. Instead, form a composite mental picture, using the whole illustration panel, of the bird in action.

Bear in mind that the symbols represent habitats which often overlap: salt-marsh may extend miles inland, bordered by fresh pasture.

KEY PARTS OF A BIRD



Any built-up area, from a city and its suburbs to a country town or village; urban parks and gardens; industrial sites and estates

Very low vegetation, not usually exceeding three feet in height, or bare ground; moorland and the Mediterranean maquis

M_S A summer migrant to the British Isles. (Summer visitors migrate north from Africa to breed in the temperate European summer)

Lakes and ponds; rivers, streams and canals; dykes and reclaimed or temporarily flooded land; reservoirs and sewage farms; bog and fen

Low base vegetation, rarely exceeding three feet in height, but with low scattered trees (ie birch, hawthorn) usually not more than 30 feet high

M_W A winter migrant to the British Isles. (Winter visitors breed in the far north, migrating south for the comparatively mild central European winter)

The seaside. Beaches, sandy or muddy; rocky coastline; estuaries; cliffs; salt flats and tidal creeks; dockyards and harbours; open sea

R_{60} Resident (ie non-migratory) and among the 60 commonest species encountered in the British Isles

R Denotes a non-migratory species, resident in Europe throughout the year. Some, however, may make seasonal movements within Europe

All cultivated land, arable or pasture, including orchards and fruit groves in Mediterranean countries; small woods and copses situated on farmland; farmyards and farm buildings

S_{60} A summer visitor which happens to be one of the 60 commonest species in the British Isles

A very rare or vagrant species

Forest—whether coniferous, deciduous, or a mixture of both; plantations, extensive parkland and open forest

W_{60} A winter visitor which is among the 60 commonest species seen in the British Isles

M_S M_W Some migrants, generally waders, pause in the British Isles while on passage during both summer and winter

KEY TO THE ILLUSTRATION PANEL

Common name of species: traditional (scientific) classification is unnecessary for bird recognition. Instead, birds are grouped by their resemblance to one another. Species most easily confused are placed on facing pages for easy comparison. Flick through the book to find a species which looks something like the unidentified bird; not many pages away will be the bird itself. A checklist of scientific names appears on pages 256-7

At least one profile of every bird is painted to a marked scale. This standard illustration shows the bird in a characteristic pose. In most cases there is also a flight illustration to a smaller specified scale

A full explanation of the symbols appears on page 12. When two species occur on the same page, their habitat preferences and status are usually identical. Status, however, may differ, and the second status symbol added to the end of the row refers to the latter species in the page headline

Courtship, breeding and other displays comprise specific behaviour patterns, usually very conspicuous in the field, and their most obvious forms are widely illustrated

Every important variation in the appearance of the species is included, whether between male and female; adult, immature or juvenile; geographical race or stage of moult

When a bird is known for some special ability or physical adaptation, this is illustrated

Size is one of the essential clues to a bird's identity. Each standing silhouette has been drawn to the same scale as a House Sparrow for comparison. With experience, a flight silhouette can be used as a primary recognition point

Behaviour alone is so often the key to identifying a bird that the majority of illustrations on each plate is devoted to portraying the most characteristic habits of the species

Flocking habits, flock size and flock shape are clues, sometimes conclusive, to the identity of most species

Behaviour on the ground can reveal a bird's identity. Some species which have an unusual appearance when seen head-on are specially illustrated in this view. Useful identification features revealed only in flight are also shown

The main text describes the bird's natural history, breeding habits and survival prospects

DISTRIBUTION MAP

- Resident all year
- Summer quarters
- Winter quarters

THE ORANGE BAND

- Months during which bird is not present
- Months during which bird is present but not breeding
- Months during which bird is present and breeding

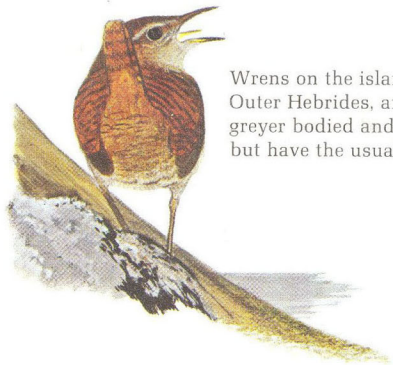
Note: the orange band shows the earliest usual date a bird may arrive and commence breeding in Europe; similarly it shows the latest usual date for the end of the breeding period and departure. The farther north, the later the event; the farther south, the earlier the event. In northern Sweden, for example, a Swallow arrives from Africa on June 1; in northern Spain, the same species arrives as early as March 15

Wren

(×3/5)

The Wren's cheerful song is outstandingly loud for so small a bird

Left: the whirring flight over short distances close to the ground. Above: almost bee-like appearance in rear view. Right: characteristic confident pose, tail cocked, often accompanied by much bobbing

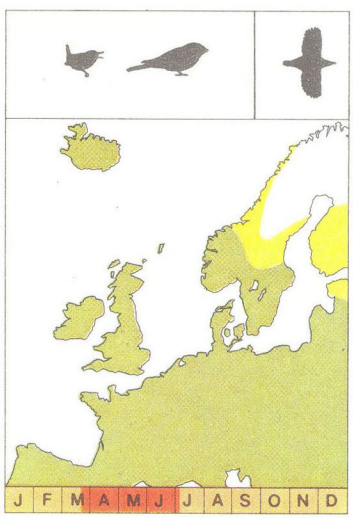


Wrens on the island of St Kilda, off the Outer Hebrides, are noticeably larger, greyer bodied and more heavily barred, but have the usual chestnut tail

Main food items are spiders, insects and other ground invertebrates. There are usually two broods of six, which tend to crowd the nest. The female bears the brunt of feeding the young

With feathers puffed out for warmth in cold weather, Wrens can look almost spherical

These birds are primarily terrestrial feeders, creeping through undergrowth or rocky crevices in search of food. This, and their habit of nesting in dark, cave-like places gave rise to their generic name *Troglodytes*: cave dweller. The low crouch is a typical Wren posture



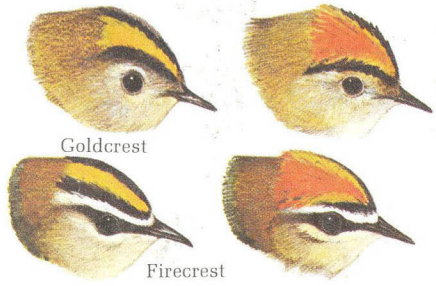
A tiny bird with a larger-than-life character, the Wren is the only Eurasian member of the large New World family, represented by ten species in the United States alone.

Known in America as the Winter Wren, our species must have crossed to the Old World in one of the milder periods of the Earth's past. It has become one of the most widespread species in Europe. Recent surveys have shown that in many British woodlands it is the most numerous bird. Able to adapt to both forested and open habitats, the Wren is found even on rocky oceanic islands such as St Kilda, where distinct races have evolved.

In spring, male Wrens will build several nests in their territory, only putting a feather lining in the one selected for laying. Some "cock's nests" are easy to find, but the chosen nursery is usually cleverly camouflaged to blend into a recess in a tree, ivy or bank. Nest boxes are sometimes used, but are more often chosen for roosting on cold winter's nights, when as many as 46 wrens have been counted, huddled in a feathery bundle, tails outwards.

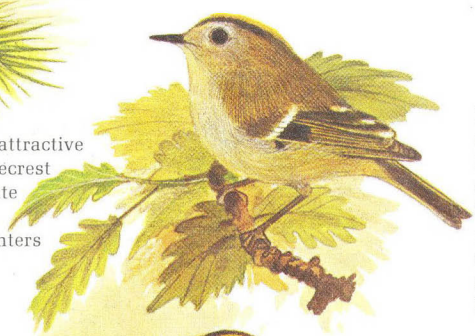
The savage winter of 1962-3 was estimated to have killed 75 per cent of British Wrens, but with two or three broods a year and a clutch of five or six, normal population levels were regained after three years. The eggs have much the same colouring as tits', and Wrens have a long fledging period of 16 or 17 days.

Firecrest-Goldcrest



The bold black and white eyestripe and richer mantle colour distinguish the Firecrest from the drabber Goldcrest in the field. Note that the centre feathers of a displaying male Goldcrest's crown are just as fiery as the Firecrest's

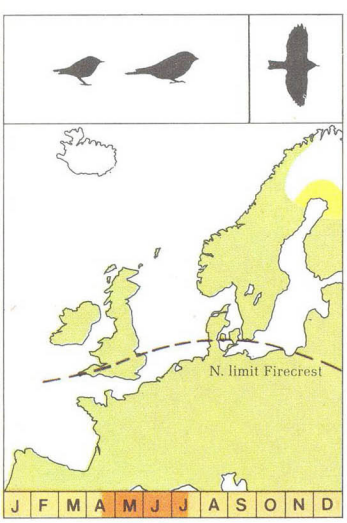
Although a less attractive songster, the Firecrest seems to dominate Goldcrests in territorial encounters



Nests built by both species are intricate hammocks of hair, moss and cobwebs suspended from a branch. Firecrests in particular are very shy when nesting, and should never be disturbed

Goldcrests and Firecrests are similar in general colouring and habits to Willow Warblers and Chiffchaffs. Both can hover to catch flying insects or to pick aphids from under leaves

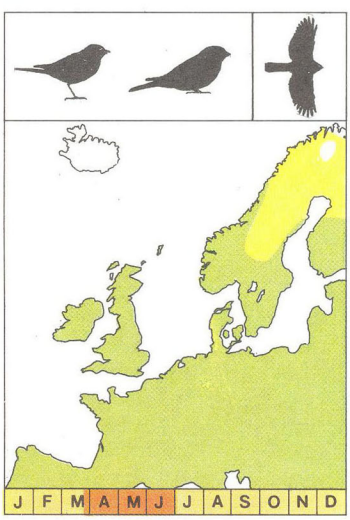
Both species are as agile as tits, quite at home hanging upside down searching buds or foliage with needle-sharp beaks for insects, insect eggs or larvae



These are the smallest European birds, about half the weight of a Blue Tit. Though sometimes amazingly tame (Goldcrests have been known to alight on a stationary observer), they can be infuriatingly difficult to locate as they flit restlessly about in dense foliage. They betray their presence with high-pitched calls, the Goldcrest's voice being thinner and less harsh than the Firecrest's: its song is a rapidly repeated jingle ending in a flourish which the Firecrest's entirely lacks. Once seen, the face pattern positively identifies either of the birds.

Both birds' nests are enchanting little hammocks of moss, hair and feathers, bound with spiders' webs and skilfully suspended under conifer boughs or amongst ivy. Seven to 11 eggs are laid, deep reddish cream in colour, and up to three broods may be reared each year. Such high productivity makes good sense for species which are extremely vulnerable to severe winters, when their insect food may be almost unobtainable. Goldcrests have the wider range but are more strictly confined to conifers – though cedars and yews in gardens and churchyards are as acceptable as forests and plantations. Firecrests inhabit cork oak woods in some of the southern parts of their range, and they have recently colonized places in southern England. In winter, Goldcrests regularly associate with tit flocks, which Firecrests rarely do. Both species are sedentary in southerly regions.

Great Tit

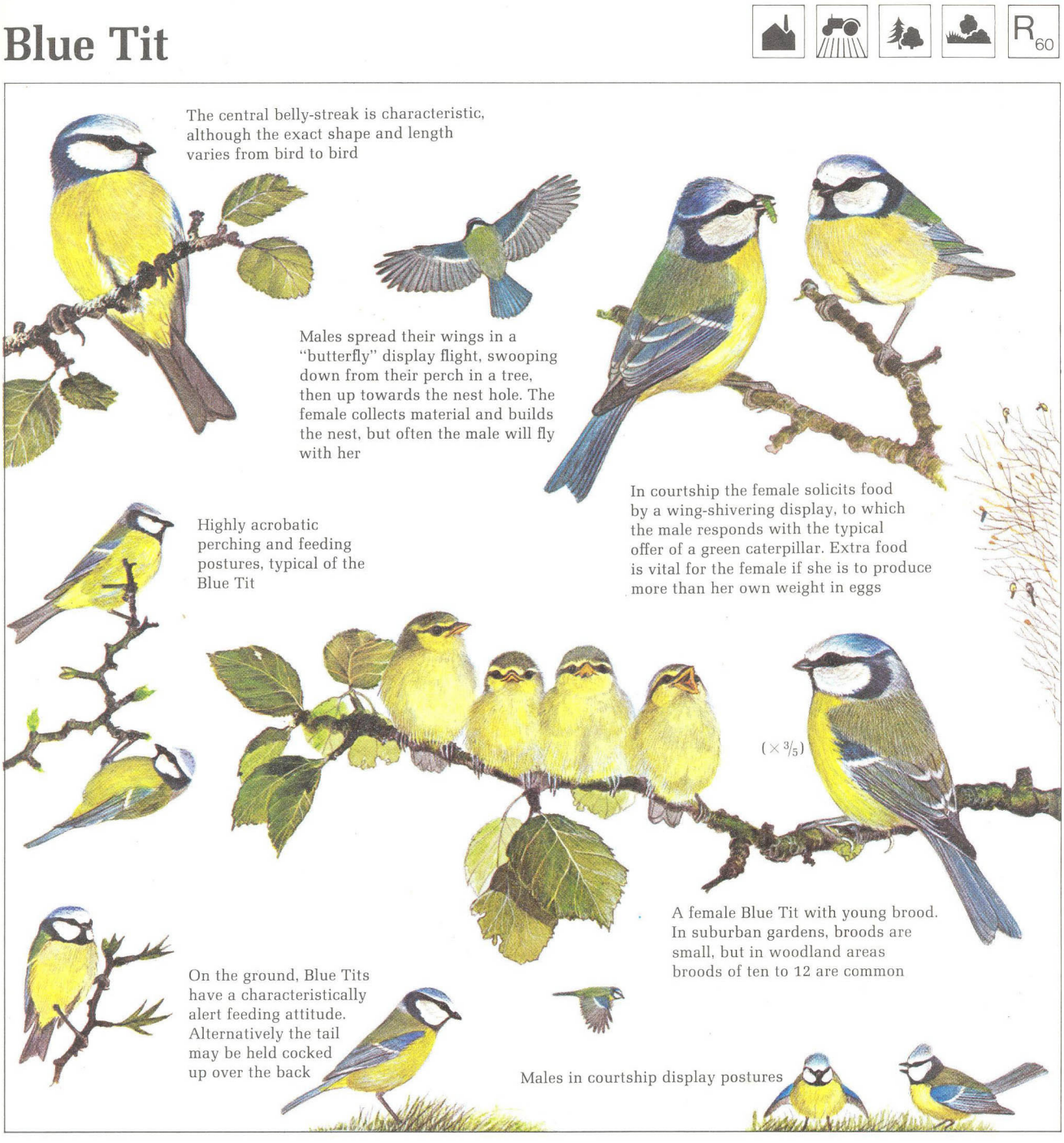


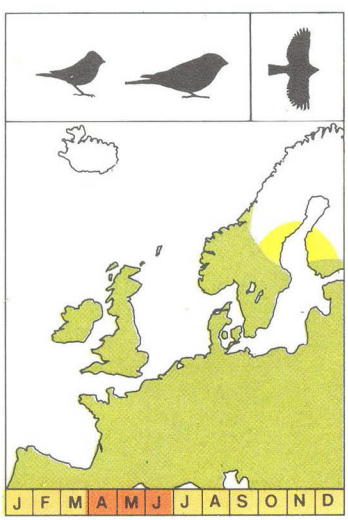
The Great Tit's distinctive "teechah . . . teechah" song is a welcome sign that spring has begun. It is common over most of Europe in woodland, agricultural and urban surroundings and has benefited from association with Man. Great Tits are the prime users of nestboxes, choosing them even where natural cavities are plentiful. They regularly visit gardens and show the strongest predilection for peanuts of all tits except the Marsh Tit. Bird tables are preferred to suspended food: Great Tits are less acrobatic than smaller tits. Such provisions are less useful at nesting time, for the young must be fed on insects. One woodland oak may provide as much food (especially weavils) as several gardens, where broods are generally smaller and less successful.

Clutch sizes average between nine and ten in woodland, and, in common with other tits, the eggs are buried in nest material when the female leaves the nest – a puzzling habit for a hole nester. Females are bold in defence of the nest, and males use the black belly stripe when trying to appear larger in territorial disputes. Great Tits have an extensive vocabulary: more than 80 different calls are recorded.

Over much of Europe, severe weather forces Great Tits to move west or southwest in winter, although in Britain this rarely occurs. This is a species which irrupts when numbers reach too high a level after a series of mild winters and good breeding.

Blue Tit





Brightly coloured and full of character, Blue Tits, next to Robins, must be the best-loved garden birds.

Like the Great Tit, the Blue Tit is a woodland species which has adapted to man-made environments. It is highly acrobatic, specializing in feeding at the extreme ends of branches. Natural food in spring and summer includes scale insects and larvae, and the timing of egg laying and clutch size are adjusted to produce young during the short-lived bounty of winter moth caterpillars. Blue Tits also take such items as oak buds and moss spore cases, and in gardens show varied tastes – they are the only tits that regularly eat bread. Many woodland Blue Tits are regular commuters to towns in times of food shortage or bad weather. Ringing shows that 1,000 or more individuals may pass through a garden in a year, even where it is unusual to see more than six at a time.

Blue Tits use the cobalt crown and wings during courtship, when the male flutters outspread wings in front of the female. The short crest is raised at all times of excitement. Clutch sizes in woodland average over 13 in some years. However, tits are in general single brooded, so the ten or so fledglings produced is comparable to a blackbird laying three clutches of four or five. Mortality is high: from a family party of 12 in early summer, just one adult and one young bird will, on average, live to breed the next year.

Marsh Tit–Willow Tit

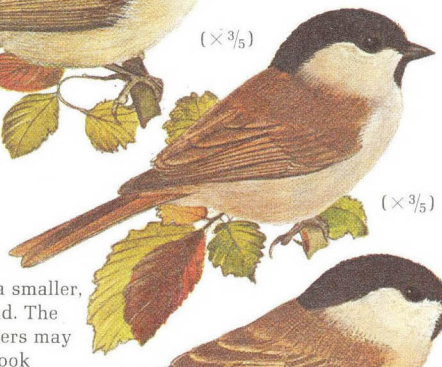
The northern race of Willow Tit, found in Scandinavia, has very white cheeks and a greyer mantle

Willow Tit: a broader bulkier neck. The crown cap is more extensive than that of the Marsh Tit

Bull-necked appearance of Willow Tit is still seen in back view. Note the slightly furry crown feathers

The white cheek patches are obvious, even from above. Young birds, below, are almost impossible to identify

(×3/5)



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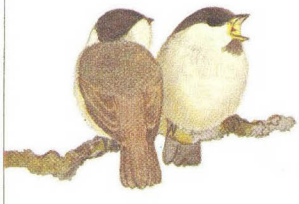

Marsh Tit: a smaller, rounder head. The crown feathers may sometimes look very glossy

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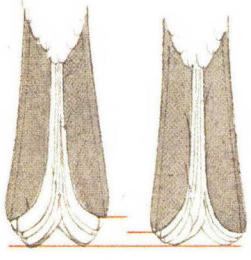
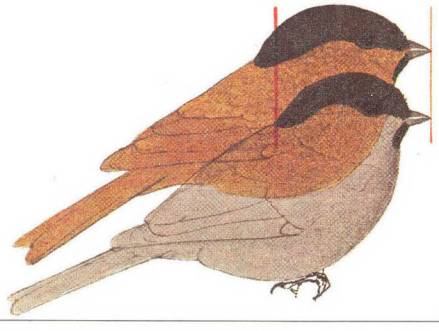
Marsh Tit, back view. Wing panels invisible, but neck clearly slimmer than the Willow Tit's, above

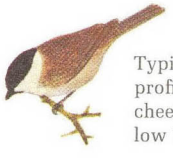


Marsh Tits' outer tail feathers are shorter than the longest by up to 3 mm; Willow Tits' by 5 to 10 mm

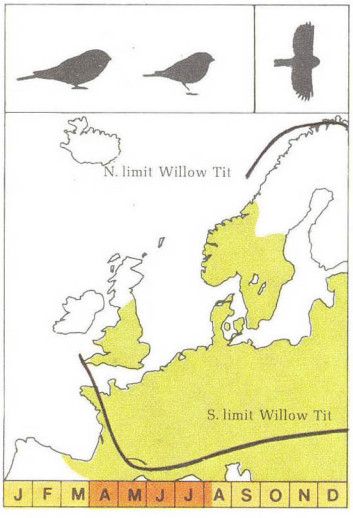
Willow Tits have conspicuous pale edges to the secondary feathers on the wing, but these may be obscured in damp weather or in the breeding season



The Willow Tit (brown) is spherical in shape compared to the Marsh Tit (grey), whose build is much more typical of the tit family



Typical Marsh Tit profile–less puff-cheeked than the Willow Tit

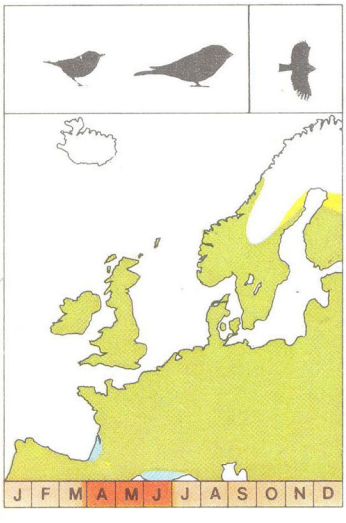


The Willow Tit was only separated as a new species in 1900, and for many bird-watchers, distinguishing it from the Marsh Tit remains a major problem. Through much of Europe their ranges overlap; in Britain the two races are most similar of all. In the diverse patchwork of its countryside, habitat preferences are ill-defined, but Marsh Tits tend to prefer drier, broad-leaved woodland, Willow Tits conifers and damper, deciduous woods.

Marsh Tits have a characteristic "pit-chew" call that the Willow Tit does not use. The then major distinguishing factor is nesting habits. Marsh Tits use natural holes; Willow Tits excavate a neat, flask-shaped hole up to one foot deep in soft, rotten wood, such as elder, and sometimes use nest boxes specially filled for them with soft, excavable material. Like all tits, both sexes excavate, but only the female builds the nest, which contains more grass, bark and wood chips than those of other tits. Both species' clutches average lower than other tits', and many Willow Tit nests are devoured by predators.

Outside the breeding season these birds are less gregarious than other tits; Marsh Tits show greater fondness for gardens, and in autumn often feed on seed heads of marsh thistle, honeysuckle berries or knapweed. Willow Tits spend more time feeding in low cover than other tits, and regularly take hemp nettle seeds in autumn. Both species are strongly sedentary.

Coal Tit

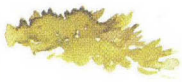


The Coal Tit is the smallest of our tits – less than half the weight of a Great Tit. Even in such an acrobatic family it stands out, flicking from branch to branch in a restless search for food. It is associated, though not exclusively, with conifers, and has become numerous in the many plantations which have been created in recent decades. Its spring song resembles a thinner, high-pitched version of the Great Tit's.

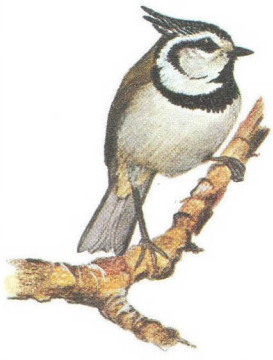
The relatively long, slender beak of the Coal Tit is more suitable than those of the Blue and Great Tit for extracting insects from cones or from behind flakes of bark. Coal Tits are assiduous food storers – a habit only useful to sedentary species and thus not often practised by Blue and Great Tits. Sites selected to store food are usually those which the bird would ordinarily search – clusters of pine needles, clumps of lichen on a branch, or crevices behind pine bark. Coal Tits commonly nest low down in rotten stumps. When these are eliminated from plantations, the burrows of rodents are used instead. A typical Coal Tit clutch contains seven to 12 eggs. As with other tits, the female builds the nest and incubates, though both parents feed the young, bringing spiders, aphids and miscellaneous small insects. Like other tits, the fledging period is rather longer than that of other birds of similar size – about 16 days. This reflects the greater safety conferred by hole nesting. Coal Tits are regular visitors to gardens.

Crested Tit

Like Greenfinches, Crested Tits circle treetops, trilling, in courtship display



The black and white crest (duller on immature birds) and the white face edged with a black "C" are unmistakable field characteristics. Its acrobatic behaviour is very similar to other tits, but the Crested Tit does not occur in large flocks

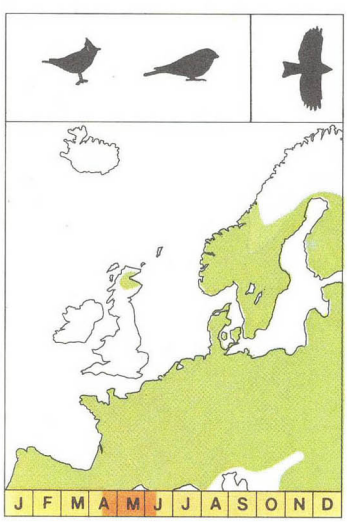


Courtship feeding is started as early as possible to bring the female into optimum breeding condition

Crested Tits often feed on trunks in a similar manner to Treecreepers

($\times 3/5$)

Nests can be located by following the Crested Tit's trilling song. Typical nest sites are holes in trunks of firs in old conifer forests

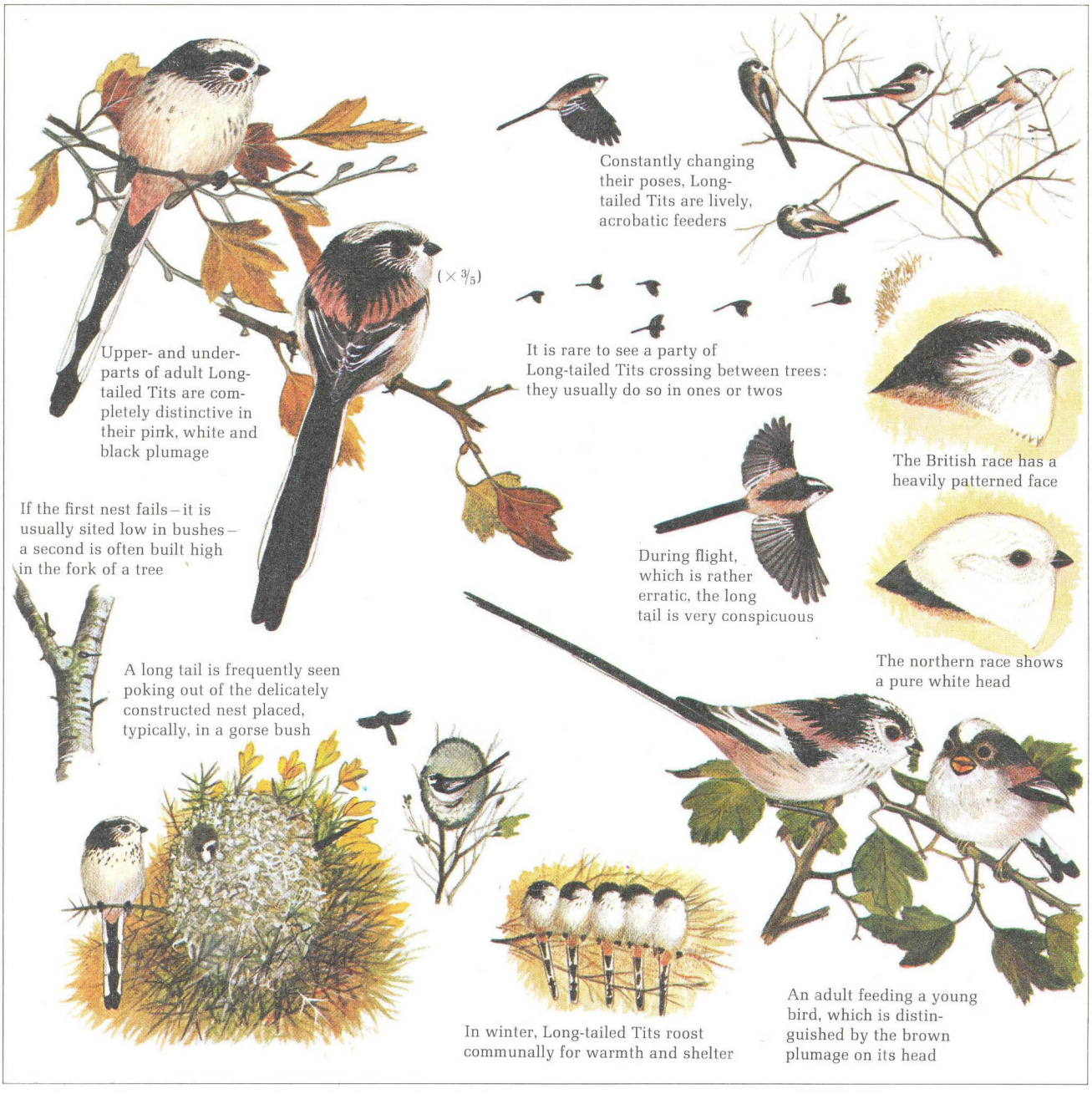


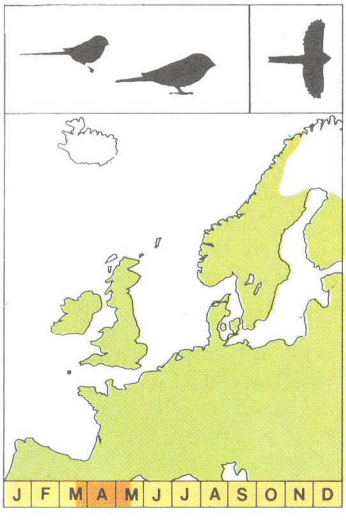
Elegant in pattern yet sober in colour, this attractive tit is found in conifer forests through much of Europe, and several races have been distinguished. One of these is confined to Scotland, where its very localized population has been much diminished by the felling of old pine forest, though there are recent indications of recovery. Crested Tits tolerate some birch or alder mixed with the pine, and in southern Europe occur in deciduous woods with scattered evergreens and in cork oak forests. They feed in pine foliage at varying heights, and on the trunks and ground. The fine beak is ideal for extracting insects from clusters of pine needles, and the caching habit is well developed.

Like the Willow Tit, the Crested Tit excavates its own nest hole in a rotten stump: the scarcity of such stumps in plantations may explain their preference for natural pine woods. Hard wood is not removed, so the nest cavity is irregular, unlike the Willow Tit's. A few use nest boxes. Rather sparse nests are built, lined with deer hair, fur and similar materials. The clutch, averaging just over five, is small for a tit, and the eggs are more strongly marked than in other species. The incubation and fledging periods, of about 14 and 18 days respectively, resemble those of other tits.

The Crested Tit has a distinctive trilling call, but no regular song. It occasionally joins parties of other tits, and is highly sedentary.

Long-tailed Tit





The Long-tailed Tit's beautiful nest is usually seen in a low gorse or hawthorn, but some are found in trees up to 70 feet high. Possibly high sites were normal until Man's activities created hedgerows. Wherever found, the nest is a remarkable achievement: its feather lining alone may account for over 2,000 journeys. Lichens stud the exterior, but pollution has almost eliminated them around large cities, where paper or even polystyrene may be used instead. Eight to 12 eggs are laid early in April. With leaves barely out, hedgerow nests are conspicuous and may suffer predation. Extra adults sometimes seen feeding young may be birds whose own broods have failed. Though now considered only distantly related to typical tits, the Long-tailed is no less agile when feeding, and has a unique method of dealing with hard items – hanging from a twig by one foot while holding the morsel in the other and nibbling from it, human fashion. Diet consists of small insects, seeds and buds.

Long-tailed Tits are vulnerable to severe weather. Roosting on winter nights, parties of five to ten huddle together in a ball to conserve warmth – not a habit shared by other tits.

Lightest of all tits, the Long-tailed is nevertheless a regular traveller. Ringing recoveries are frequently over a 30-mile range, and one party of seven netted together moved 25 miles in four days. Continental birds cross the North Sea in some winters.

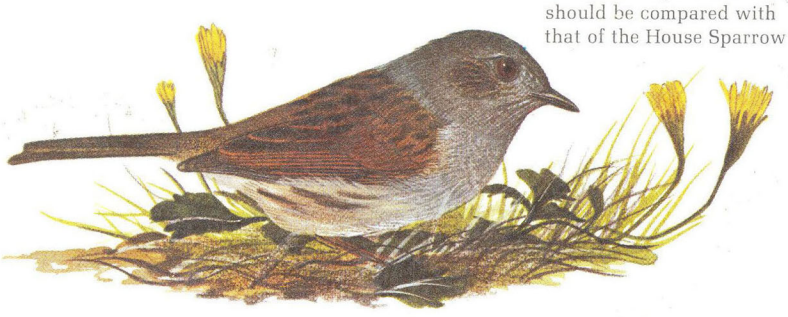
Dunnock

The Dunnock, or Hedge Sparrow, is often seen flying across roads from hedge to hedge, and this habit has made it one of the most frequent casualties of the motor-car

Compared with the vigorous action of the House Sparrow, a Dunnock flies with an unhurried, undulating, almost delicate motion. Its grey head and streaked back are often visible in flight

($\times \frac{3}{10}$)

A bird in worn plumage, below, has an almost grey head and very faint spots around the eye. The beak should be compared with that of the House Sparrow



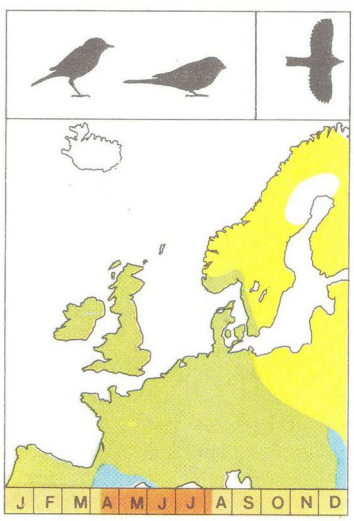
In new plumage, Dunnocks can be confused with House Sparrows: both have similar barring on the back. But Sparrows never have grey underparts, nor do they have streaked flanks. Also, a Dunnock has a distinctively delicate beak, rusty orange eyes and a grey head

($\times \frac{3}{5}$)

Seen at close range the Dunnock's plumage is surprisingly attractive with its subtle patterning

Birds sing and feed in hedges and bushes. Legs and feet are bright orange

These birds move about unobtrusively, creeping over the ground in a crouched posture, delicately picking at the surface. Although their usual pose is horizontal, Dunnocks, like Sparrows, can stand upright



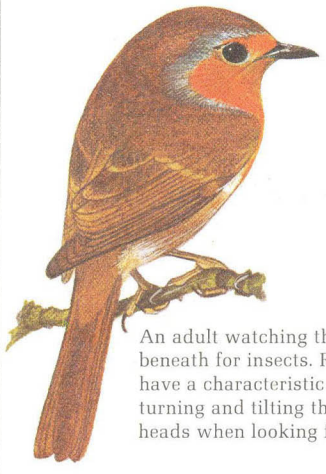
American bird-watchers visiting Britain often surprise their hosts with eager requests to be shown a Dunnock. Their interest in this drab bird is due to its being the only common member of the accentor family – a small but distinctive group confined to Eurasia.

In the west of Europe and Britain, it is a common garden bird – rarely seen on the bird table, but often feeding beneath it, and quite approachable. Elsewhere, though equally numerous, Dunnocks are shy and secretive, best detected by the plaintive, rather penetrating call note. They have a wide habitat tolerance: some open ground is needed for feeding, but with cover of bushes or trees near by. The diet probably consists of small invertebrates in summer, replaced or augmented by seeds in winter.

In spring, males choose high perches from which to produce the warbled song which somewhat resembles the Wren's, only more subdued and without the terminal trill. Both sexes may be seen displaying on the ground, wings shivering and tails flicking as male chases female. Nests are built of grass, lined with hair and usually some bright green moss, contrasting pleasingly with the four to six bright blue eggs.

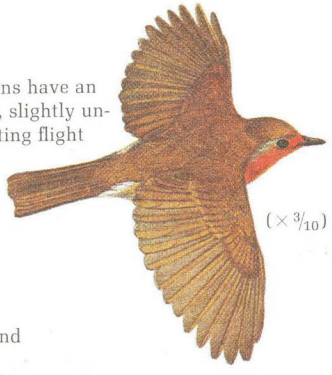
Despite the Dunnock's abundance, its migrations are poorly understood: in western Europe it is sedentary, but occasionally, when population levels are high, birds transfer to adjacent areas in wave movements.

Robin



An adult watching the ground beneath for insects. Robins have a characteristic way of turning and tilting their heads when looking for food

Robins have an easy, slightly undulating flight



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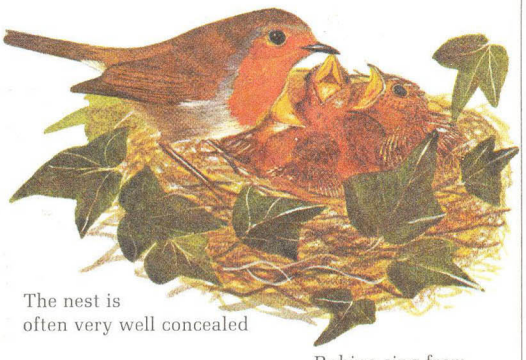
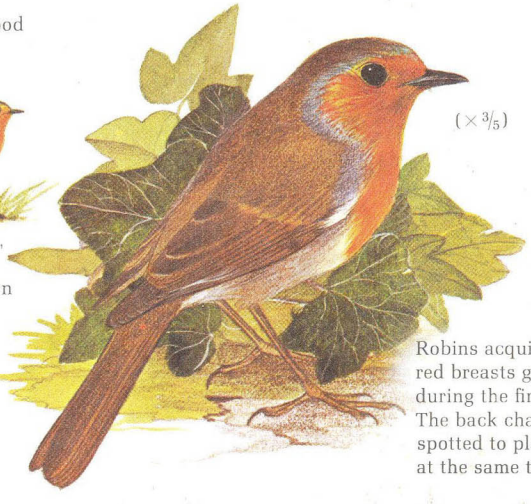


The nest is often very well concealed

Robins sing from both open and well-concealed posts

Left, a bird about to pick up food, head tilted. Right, alert posture of bird moving about lawn



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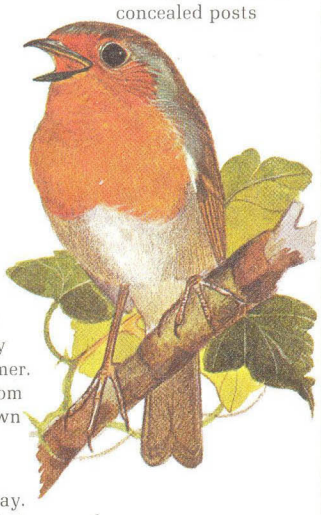
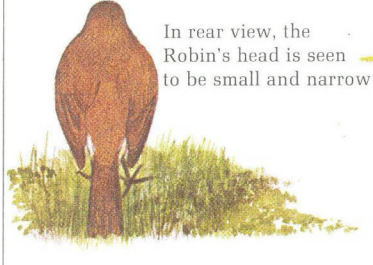


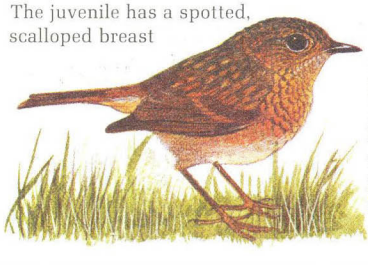
Robins acquire their red breasts gradually during the first summer. The back changes from spotted to plain brown at the same time



In rear view, the Robin's head is seen to be small and narrow

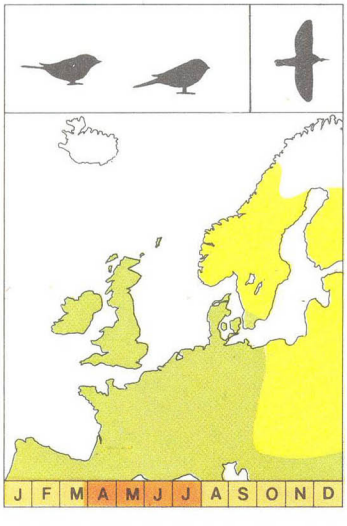
Below right, the threat display. Red breast puffed out, the bird sways from side to side. In extreme anger, the head may be thrown back

The juvenile has a spotted, scalloped breast



The young can be identified on behaviour alone: like their parents, they hop, hesitate, and then tilt the head to one side

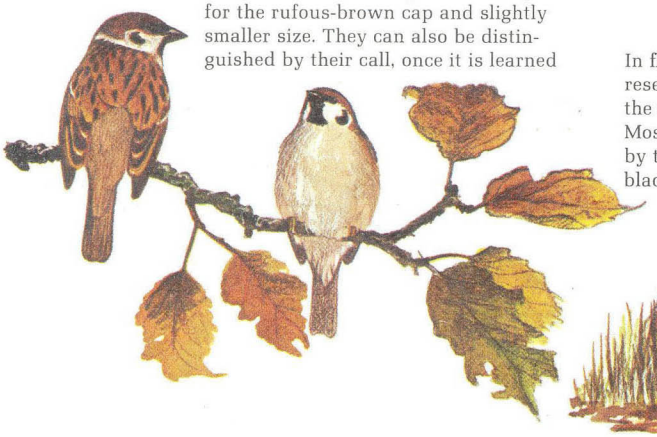
The attacking attitude



Britain's national bird, the Robin has lent its name to red-breasted birds throughout the world. Its popularity stems largely from tameness: birds regularly feed at gardeners' feet and are easily trained to enter houses or peck from the hand. Nevertheless, through much of the Robin's range it is a shy, woodland bird, better known for its "ticking" alarm call. Strongly aggressive, males attack ferociously even a bundle of red feathers. The fluffed-out red breast is used in threat by both sexes, as females too hold territories in winter, and also sing. In spring, territorial boundaries change, and the male's song becomes louder and more robust. With such aggressive temperaments and similar plumages, females entering a male's territory must adopt submissive behaviour to avoid violent rejection.

Nesting begins early, and three broods may be raised in a season. Notorious for choosing strange sites in houses and gardens, Robins may also be tempted into an open-fronted nest box. In natural habitats, the nest is cleverly concealed in a bank or tree crevice. Its thick foundation of dead leaves is as distinctive as the five or six creamy, rust-freckled eggs. Fledgling Robins have brown speckled plumage, which serves for camouflage from predators, and prevents arousing the anger of red-sensitive parents with new broods. The red breast develops during the first summer, equipping the bird for staking claim to winter territory.

Tree Sparrow

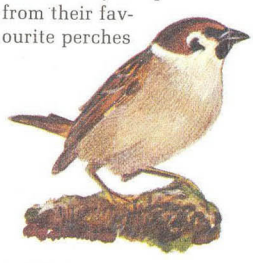


A pair sitting still in a tree: very similar to the House Sparrow, except for the rufous-brown cap and slightly smaller size. They can also be distinguished by their call, once it is learned

In flight a Tree Sparrow closely resembles a male House Sparrow, sharing the same rufous-brown shoulder patch. Most reliable identification is by the white collar and the black spot on the white cheek

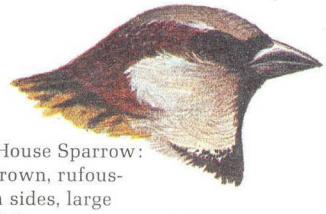
(×3/10)

Unobtrusive while they feed, Tree Sparrows creep along the ground, picking around for food

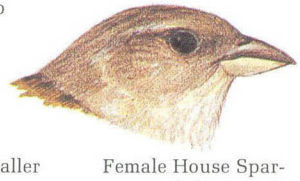


Birds are frequently seen flicking their tails as they chirp from their favourite perches

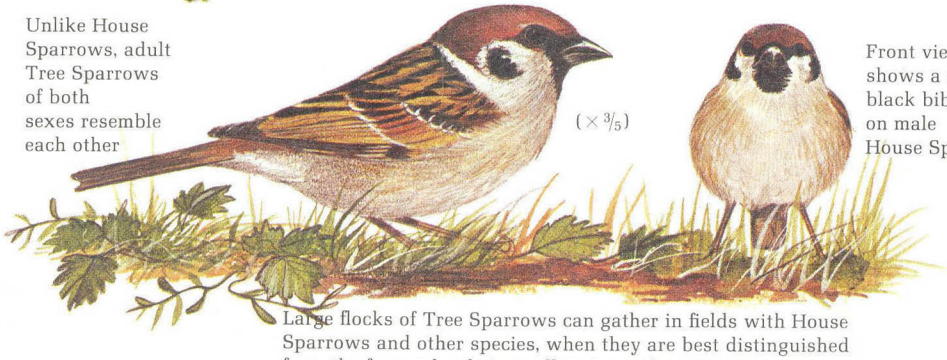
Tree Sparrows nest in holes in trees, but also take to nestboxes



Male House Sparrow: grey crown, rufous-brown sides, large black bib



Female House Sparrow: pale beak and no colour on face



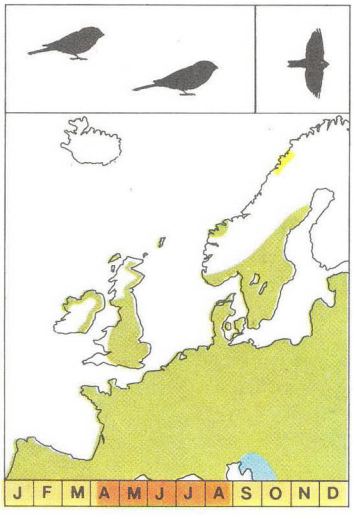
Unlike House Sparrows, adult Tree Sparrows of both sexes resemble each other

(×3/5)

Front view shows a smaller black bib than on male House Sparrow

Large flocks of Tree Sparrows can gather in fields with House Sparrows and other species, when they are best distinguished from the former by their smaller size and neater appearance

Tree Sparrow: rufous-brown cap, white cheek, black spot

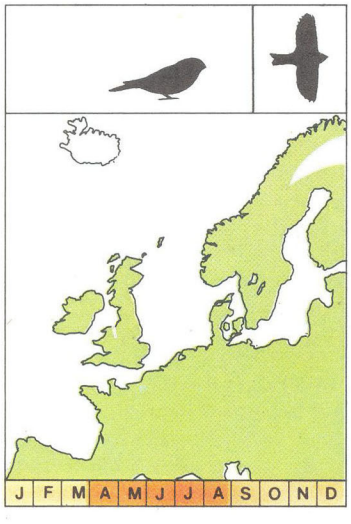


In Europe, the Tree Sparrow is everywhere less numerous and more restricted in habitat than the House Sparrow, though in eastern Asia, where the House Sparrow is absent, it seems to occupy a similar niche, and in places reaches pest status. Generally, it is restricted to woodland edges, wooded gardens and the like, where it has trees near by for nesting, and access to cultivated fields or farmyards for feeding. The normal nest site is a hole in a tree, but buildings or haystacks are sometimes occupied, and Tree Sparrows are regular users of nestboxes, often ousting other tenants, such as Blue Tits. Their smaller size enables them to enter holes which a House Sparrow cannot negotiate.

The nest is an untidy one, similar to the House Sparrow's, but the eggs are distinctive – deep mottled brown, as opposed to the variable grey speckling of the House Sparrow's. Clutches vary from two to eight eggs, but most commonly contain five, and two or three broods are raised. Both sexes share in incubation, and this lasts 12 to 14 days. The fledging period is of similar length and both parents feed the young.

Tree Sparrows associate in flocks at all times, and these are at their largest and most obvious when feeding on grain in late summer – often in company with House Sparrows. The presence of Tree Sparrows among a flock of the larger species can be detected by their characteristically higher-pitched chirp.

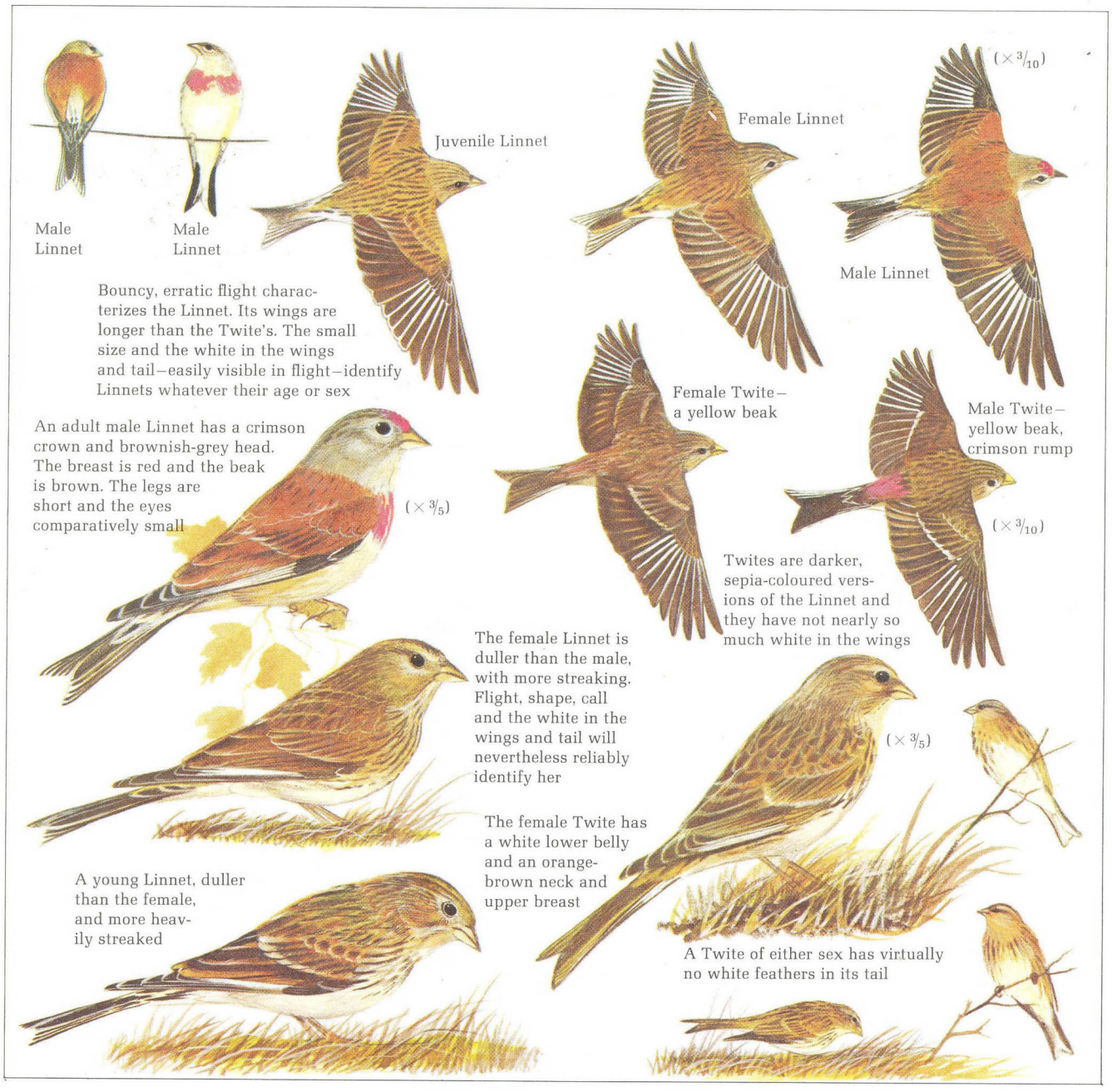
House Sparrow

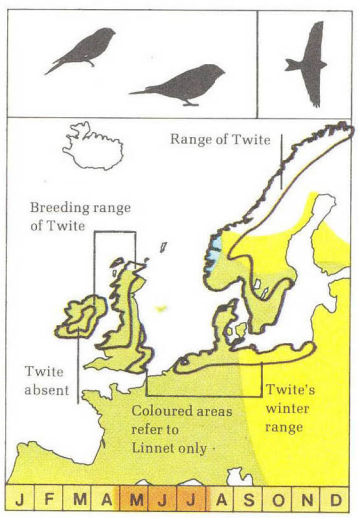


Some people like the Common or House Sparrow for its cheeky opportunism, some hate it for eating grain and blocking gutters, but everybody knows it. Despite an apparent tameness, it is a wary, tough little bird which thrives not only in its native Eurasia but in other continents to which it has been introduced – notably North America.

The chirruping calls are varied, though instantly identifiable, but there is no distinct song. Males seeking mates build a nest and advertise by chirping incessantly near by. The birds visit their nesting colonies throughout much of the year – least often during the moult, which takes place in late summer or early autumn – but breeding is mainly confined to spring and early summer. Nests are placed in cavities in buildings or in trees and ivy, and are exceedingly untidy structures of grass and straw lined with feathers, often domed. The clutch size varies from two to seven. First-year females tend to lay smaller clutches than older birds. Both sexes incubate, the male's share increasing throughout the incubation period. This is of variable length, but averages about 12 days – the issue is confused because incubation often starts before the clutch is complete. Hence the young may be of different ages. Fledging periods may be as short as 11 days, but 18 seems typical. Both sexes bring food, but at first this is mainly the job of the male, while the female broods the young.

Linnet—Twite





Though one of Europe's most abundant finches, the Linnet has never become a garden bird, although often found near farms. Its diet consists of seeds from a variety of common plants, such as dock, charlock and goosefoot, and its English name probably derives from linen, the textile obtained from flax, a favourite food plant. Occasionally birds lose the sight of an eye through injury by the hooked seeds of plants such as burdock. Even during the breeding season, Linnets feed in restless, chattering flocks, and the cheerful twittering song is a characteristic sound of the gorse-studded heaths where they live.

The nest is a small, grassy cup, warmly lined with hair or feathers, placed low in a gorse, broom or bramble bush, several often being sited close together in small colonies. Four to six eggs form the clutch, incubated by the female, who is fed on the nest by the male. Feeding the young is by regurgitation. Though both sexes share in feeding the nestlings, the male may give his food to the female, who then passes it to the offspring. Linnets resemble most finches in consuming the young's droppings during the early days of fledging.

The Twite is a more northerly counterpart of the Linnet, resembling it in general habits, but choosing moorlands as a breeding habitat. The nest is normally sited in heather, and only one or two broods are reared compared to the Linnet's two or three.

Redpolls

(×3/10)

Mealy Redpolls are the continental race, Lesser Redpolls the British and Alpine race

All Redpolls have the same circular, dipping song flight, accomplished with slow wing beats. They also sing from their perches and in ordinary flight

Male Lesser Redpoll

(×3/10)

Above, a Mealy Redpoll is smaller and darker than an Arctic Redpoll, larger and paler than a Lesser Redpoll

(×3/5)

Male Lesser Redpoll

(×3/5)

Arctic Redpoll

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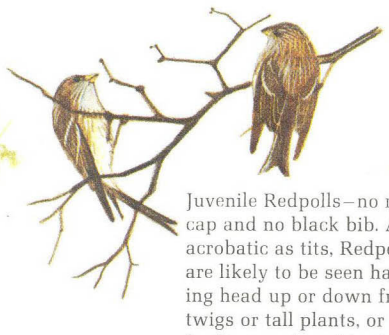
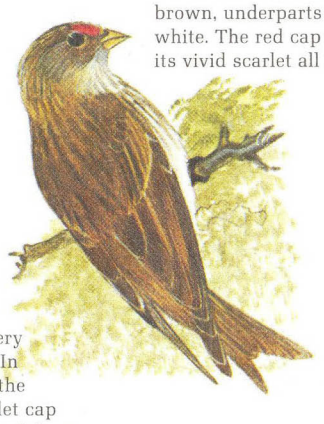
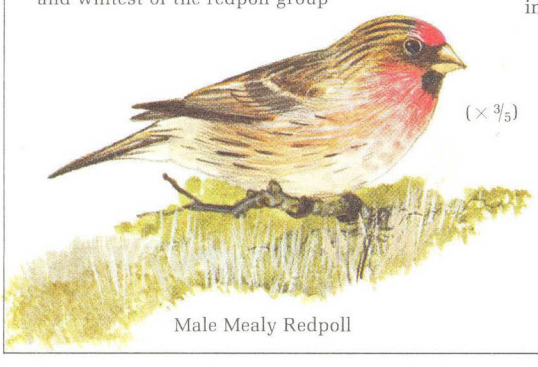
An Arctic Redpoll (a separate species of Scandinavia and the high Arctic tundra) is the largest and whitest of the redpoll group



Juvenile Redpolls – no red cap and no black bib. As acrobatic as tits, Redpolls are likely to be seen hanging head up or down from twigs or tall plants, or feeding on riverside alder in company with Siskin



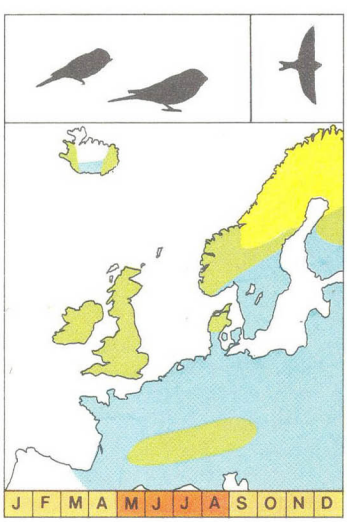
A Lesser Redpoll in late summer. Its upper plumage wears to an almost uniform dark brown, underparts to a shiny white. The red cap retains its vivid scarlet all the year



(×3/5)

Male Mealy Redpoll

They are tiny, active birds, with pointed wings that look very long in proportion to the body. In spite of the profusion of races, the very clear twin features of scarlet cap and black bib reliably separate adults of the Redpoll group from all other species



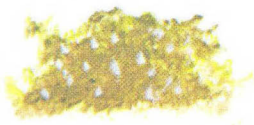
Seen at a distance, Redpolls might easily be mistaken for Linnets were it not for their distinctive call – a staccato "ch-ch-ch-chaa", following the rhythm of the letter V in the morse code. In the breeding season, this is interspersed with trills made by the male as he flies around his territory.

In western Europe, Redpolls breed in Britain, the Alps and the Carpathians. Another species of Redpoll breeds in Scandinavia, and right round the sub-Arctic and low Arctic. Although primarily birds of birch and alder forest, Arctic breeders inhabit open tundra where the only cover is juniper or dwarf willow. In Britain, Redpolls have recently begun to colonize conifer plantations. Birch and alder seeds are important items of the diet, and a variety of grass and weed seeds is also eaten. During spring, buds and insects are consumed.

Nests are often fairly close together in loose colonies, and may be placed in almost any tree or bush, usually from three to 15 feet high, but sometimes much higher. Materials used are twigs and grass, with a lining of vegetable down. The usual clutch of five is incubated by the female alone for 11 days, and both parents feed the young with food carried in the throat. Fledging takes place after 12 days, and two broods are often reared. Arctic breeders are highly migratory and winter in many parts of Europe. European breeding birds are more sedentary.

Greenfinch

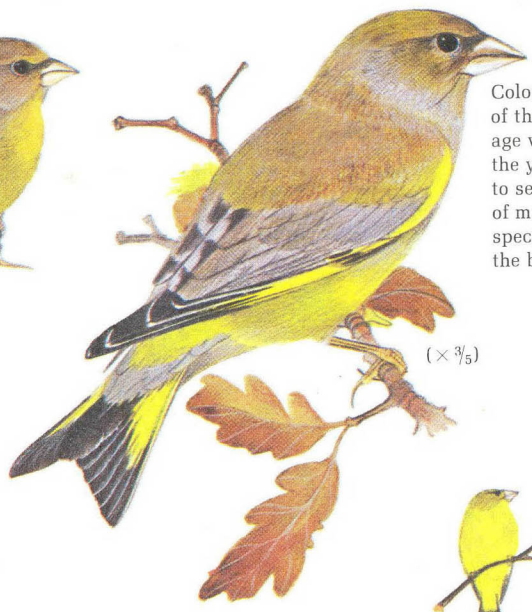
The erratic "butterfly" display flight takes place over the treetops



Predominantly green and yellow, this long-winged, strong-bodied species is unmistakable. Flight action—erratic and bounding—is typical of other finches. Young and females have darker colouring than this adult male, but always show the same yellow patches on wings and tail

(× 3/10)

Adult female



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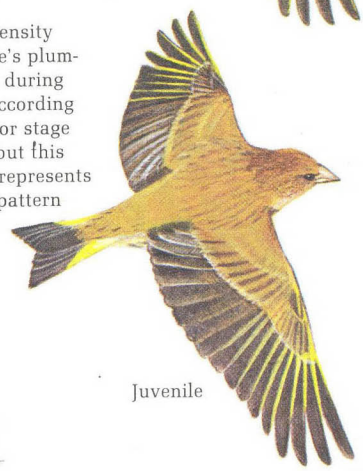
Colour intensity of the male's plumage varies during the year according to season or stage of moult, but this specimen represents the basic pattern

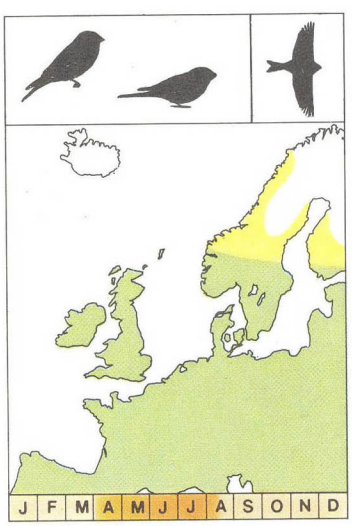


Juvenile

Frowning, aggressive behaviour characterizes Greenfinches—especially adults. At a bird table, they will spend more time fighting over peanuts than eating

On dull days, a female or young bird can look much like a female sparrow, and may be overlooked when feeding

Large flocks of Greenfinches gather to feed in fields with other species, such as Yellowhammers, Chaffinches and Sparrows

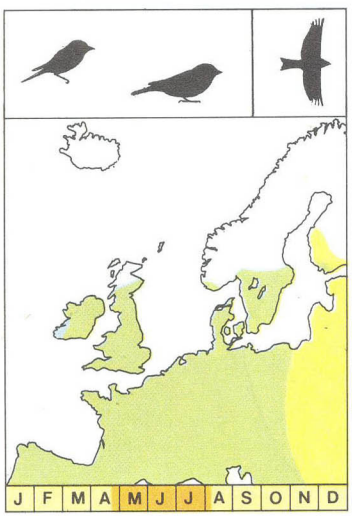


The bright plumage of the Greenfinch brings a frequent and pleasing touch of colour to suburban bird tables: over 1,000 different individuals have been ringed in some gardens during a single winter. Somehow, they can sense coming changes in the weather, and the arrival of large flocks of Greenfinches at the bird table is an excellent indicator of cold weather in the next few days. Sunflower seeds and peanuts attract them most, and by active feeding they will acquire an extra store of fat (perhaps 10 per cent of their body weight) to provide insulation and tide them over any food shortage.

Outside the suburbs, Greenfinches frequent woodland edges, arable land and waste ground. Dog's Mercury and elm seeds are common summer foods, with yew and hornbeam in autumn, rose and bramble in winter. On farmland and waste ground, chickweed, dandelion, persicaria, burdock and charlock are all taken. Greenfinches are rarely troublesome to farmers, despite a liking for cereals, hemp, flax and sunflowers.

The nest is rather untidy, lined with feathers, and often placed in a dense thorny bush, not as a rule very high. Nests are often grouped in small, loose colonies. Four to six eggs are laid, and two or three broods raised. The male defends his territory with a twittering song ending on a monotonous loud wheezing note, often uttered in a display flight.

Goldfinch



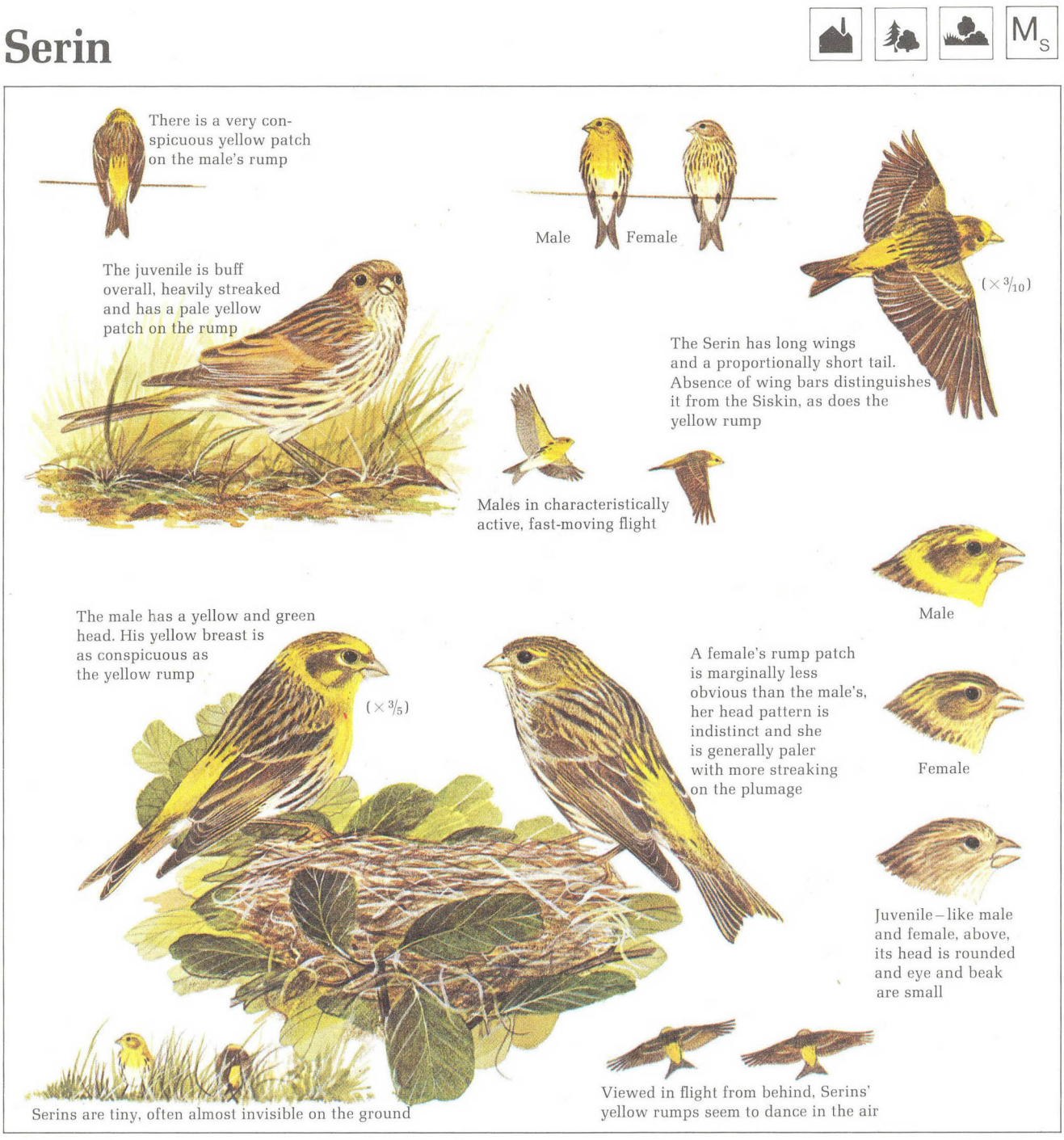
The attractive plumage and cheerful twittering song of the Goldfinch have resulted in considerable persecution by Man. About 1860, at one site in Britain, an estimated 132,000 were caught each year. The species is now protected in this country, but in some places, especially Belgium, thousands are still being caught and caged.

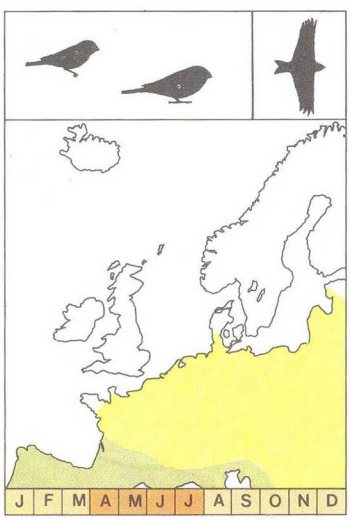
Goldfinches are primarily birds of woodland edges and glades, and have adapted well to scrub and waste ground. The fine, sharply pointed bill is ideal for extracting seeds from groundsel or dandelion, and they also specialize in seed-heads of thistles, teazels and burdock. The short, stiff, red face feathers resist the prickles, but goldfinches occasionally get trapped on barbed hooks despite their agility on swaying stems. They are particularly adept at using the feet in feeding, and can be trained to pull in suspended food using the feet to hold successive loops of thread.

The nest is beautifully neat, made from grass, moss and lichens, with a startlingly white lining of wool or thistle overlain by a few contrasting black horsehairs. It is sited usually at the end of a flimsy branch, often in a garden or orchard. Clutches of five or six and two or three broods per year are usual. After a good summer, large flocks congregate on thistle patches.

Many Goldfinches winter in western Europe, but northern birds move to France, Iberia and North Africa.

Serin





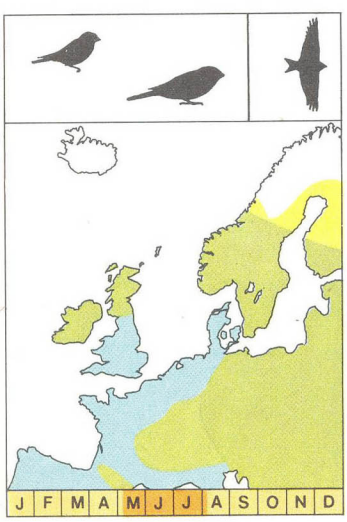
A Serin's tinkling song is interspersed with trills very similar to the Canary's, reminding one of its close relationship to that familiar cagebird. Once an exclusively southern species, it has been spreading north and east for some 200 years, a trend which has accelerated during the past 20 years. Breeding first occurred in Britain and Finland in 1967, and the species has been regularly reported in the vicinity of Leningrad.

Serins prefer a mixed habitat, and thrive in the patchwork of wood, farm and town that covers much of modern Europe. In spring, important food items are elm buds, birch catkins and dandelion seeds, while in summer they turn to a wide variety of grass and weed seeds, often visiting such places as allotments and railway yards or well-timbered gardens and town parks. Brassica and persicaria seeds are favoured in autumn, mugwort in winter.

These are the smallest of European finches, and might be confused with Siskins. However, they lack yellow tail patches, and instead have a very bright yellow rump and a yellow eye-ring and eyestripe. Serins have stubby beaks, Siskins have pointed ones, used for extracting seeds from cones.

The nest is hidden usually near the end of a branch, anywhere between three and 40 feet high. Normally four eggs are laid, and there are two broods in the northern part of its range, more in the south.

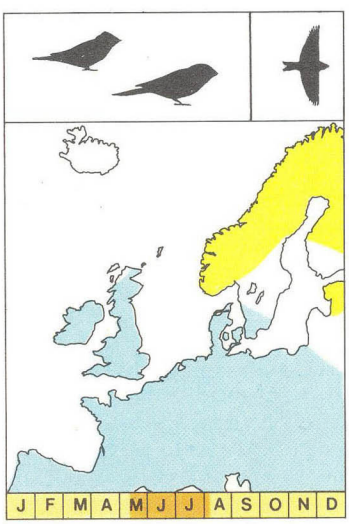
Siskin



The fortunes of this tiny but attractive finch are, like the Crossbill's, linked with the crop of spruce seeds, though unlike the Crossbill it cannot force cones open, but must wait for their scales to part naturally. In good years, breeding begins in April, leaving time for a second brood. In poor years, this early brood is missed out, and for young hatched later, there are supplements such as pine cones (which ripen later than spruce), elm, docks and thistles. Its nest is small and neat, placed high in a conifer. Three to five eggs are laid, and incubated by the female. Males have a sibilant, twittering song, often uttered in a circling display flight. Out of the breeding season, the high-pitched, rather liquid contact note is a reliable guide to identification.

From July and August, birch seeds are an important food. These, too, fluctuate in quantity, affecting the Siskin's migrations. When birch crops in Scandinavia are good, Siskins migrate south later and in smaller numbers. Alder cones are an important food source in winter, and in many areas Siskins have taken to feeding on nuts and fat put out for them in gardens, finding the food especially attractive when placed in red or orange containers. Siskins are agile when feeding, and adept at using their feet to bring hanging food into reach. These habits make them popular as cagebirds, and large numbers are still caught in Belgium and around the Mediterranean.

Brambling



During the winter of 1951-2, an estimated 70 million Bramblings congregated in Switzerland in the neighbourhood of Hunibach, and the country as a whole may have held almost the whole population breeding west of the Urals. Concentrations of this size are unusual, but Bramblings are noted for the unpredictability of their migrations: birds wintering in Britain one year may be in Italy the next. This irregularity may be associated with the dependence of Brambling flocks on the seeds of a few trees (especially beech) that tend to be produced plentifully in alternate years in different localities. Thus, in many areas, bird-watchers will see large numbers of Bramblings roughly every other year. When beech mast is exhausted, Bramblings will flock with other finches on arable fields, feeding on weed seeds or grain.

The breeding range of the Brambling starts roughly where that of its close relative the Chaffinch stops. It is a common bird in Scandinavian birch woods in summer, second in abundance only to the Willow Warbler. Its melodious song, similar to the Redwing's, is heard only for a brief period. Like Chaffinches, Bramblings take a substantial quantity of animal food at all times, and this is specially important in northern breeding areas, where available insect food far outweighs suitable plant food. The nest resembles the Chaffinch's, but is bulkier, since the clutch it accommodates is larger—six or seven eggs.

Chaffinch

Adult male

The conspicuous double wing-bar is not found on any other European finch

(×3/10)

Adult female

Male

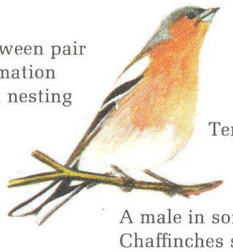
Female

There is little difficulty in telling Chaffinches apart from other small finches: markings, flight pattern and the jerky, cocksure ground movements are all quite distinct

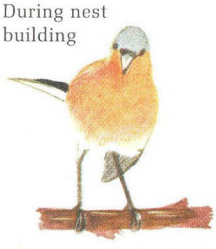
Between bouts of flapping, the Chaffinch closes its wings completely, to produce the characteristic rising and falling flight

Below, displays used by the male Chaffinch

Between pair formation and nesting


Territorial defence

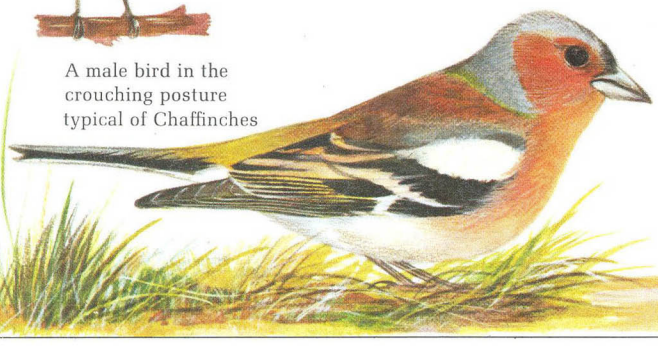
During nest building



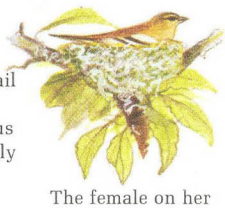
A male in song. Chaffinches sing constantly during the breeding season

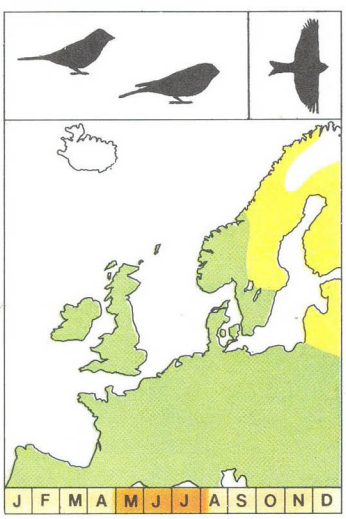
Adult female–markings almost identical to those of the adult male

(×3/5)


A male bird in the crouching posture typical of Chaffinches

Feeding is typically done in a series of short, jerky hops. The white wing and tail markings are visible from behind, as is the nape patch. Despite their conspicuous patterning, these birds merge surprisingly well into the background


The female on her delicate lichen- and cobweb-covered nest



The Chaffinch's exuberant song is a familiar springtime sound throughout Europe, yet travelling bird-watchers can detect noticeable differences in local dialect even within a small country such as Britain. Its alarm call, however, is constant and closely resembles the Great Tit's call.

Though one of Europe's most numerous birds, the Chaffinch population has recently been decreasing. Numbers in Britain have dropped considerably since 1960, coinciding with the use of toxic seed dressings. As the bulk of the Chaffinch's food is weed seeds and cereal grains obtained from the ground, it is obviously vulnerable to such hazards. Other foods include beech mast, and the young are fed on insects.

Chaffinches breed in all types of woodland, scrub, hedgerows and gardens. The nest is a very neat cup, lined with feathers and flecked outside with lichens, often blending imperceptibly into a tree fork. Building is by the female alone, with the male in idle attendance. Five eggs are laid, with distinctive wine-coloured markings, and unlike other finches only a single brood is raised. Incubation is by the female and may be as brief as 11 days. Both parents feed the young.

Winter flocks feed in open fields, but roost in woods, preferably among evergreen bushes. The sexes migrate to different areas, and, in any one place, flocks are likely to consist entirely of either males or females.

Hawfinch

Inside the Hawfinch's beak: to give a firm hold on hard seeds, there is a plate of serrated ridges on the roof and on the lower jaw. Young birds have to eat soft seeds–the plates harden as the skull ossifies

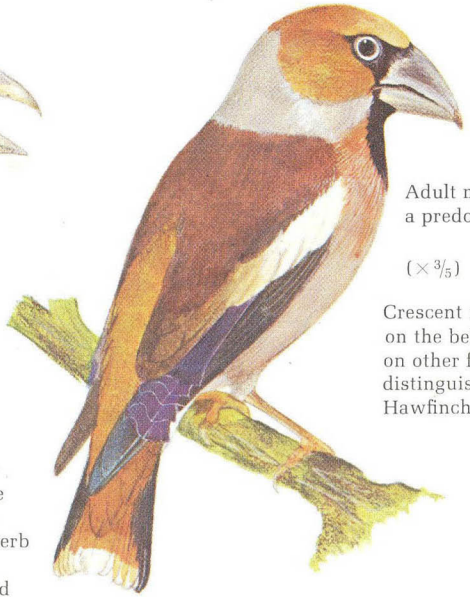
A young bird has the same underwing pattern as an adult

Adult

(×3/10)

The Hawfinch is short-tailed and surprisingly long-winged. From above or below, its patterning is very conspicuous. In winter, the male bird's beak turns to pale yellow

Both head and beak are massive. This image is three-quarters life size



Adult male in summer, with a predominantly blue beak

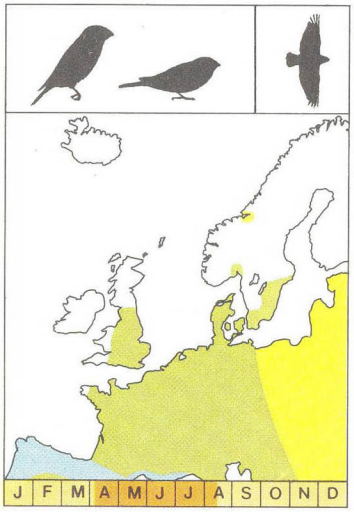
(×3/5)

Crescent markings on the belly–not found on other finches–distinguish the young Hawfinch

A Hawfinch secondary feather has this unique shape, whose purpose is not known. The superb blue-green sheen is on both the secondary and primary feathers

Left, one of the male's courtship display postures. Its dignity tends to be marred by the hesitancy of his approach to the female, whose response is often aggressive. Below, the bill-touching ceremony

This species has a habit of feeding unobtrusively on the ground, then rushing straight up into the trees without warning. Return to earth is slow and hesitant

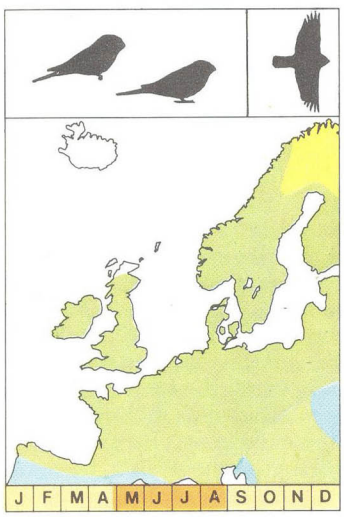


With its massive head and striking wing-bar, the Hawfinch should be easy to identify, but it is very shy and difficult to observe in its orchard or woodland habitat. The "tick" contact call–often used in flight–may help to locate it, as may the audible crunching of seeds produced by a feeding flock.

Its heavily reinforced skull bears powerful jaw muscles and the huge pyramidal beak has been calculated to exert pressures of over 150 pounds per square inch, adequate to crush hornbeam seeds, a favourite food, or to extract the nutritious kernels from the stones of damsons, sloes, olives and cherries. Stones are held vertically rather than horizontally between the jaws: this way they crack at lower pressure. In autumn or winter, flocks regularly feed under cherry trees on the stones of fallen fruit. In late winter, hips and haws are taken, and even oak buds. During early summer some caterpillars are eaten, and Hawfinches have been seen to catch large beetles on the wing.

During courtship, the male lays the foundations of the nest and sits on them, tempting females with feeding gestures. If she accepts regurgitated food with appropriate submission, all is well, and she completes the nest. The clutch contains four or five eggs, and two broods are usual. Hawfinches sometimes nest in gardens or orchards, but should not be approached, as they are extremely prone to desert.

Bullfinch



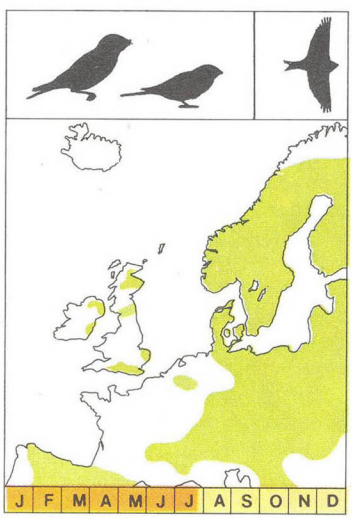
Loved for its elegant plumage, hated for its destructive attacks upon buds, the Bullfinch thrives none the less. In parts of Britain it is now commoner than the Chaffinch.

This bird's ravages on flowers and crops have caused its feeding habits to be closely studied. In gardens, lilac and forsythia may be stripped of flowers, while, on farms, currants, gooseberries and especially peas may be devastated. A single bird may strip up to 30 buds per minute. Curiously selective, Bullfinches favour Conference pear buds, but avoid Doyenné du Comice. Damage is worst near woods or hedges, where the birds can shelter when disturbed. Seeds of preferred trees (birch and ash) are produced in quantity every second year, and damage to buds tends to be worst in the lean years.

Bullfinches are quiet birds: the song is barely audible more than a few feet away, and the contact call is a soft, plaintive whistle. They are rarely seen in flocks of more than a dozen – and a single pair moving along a hedgerow is a more common sight.

The nest is frail but distinctive – a platform of twigs supporting a cup of fine roots, usually sited in a thorny bush. In it are laid five or six blue, maroon-freckled eggs, which the female incubates. Both sexes feed the young from a specialized throat pouch, which is developed only during the breeding season. Northern birds migrate, other birds move short distances.

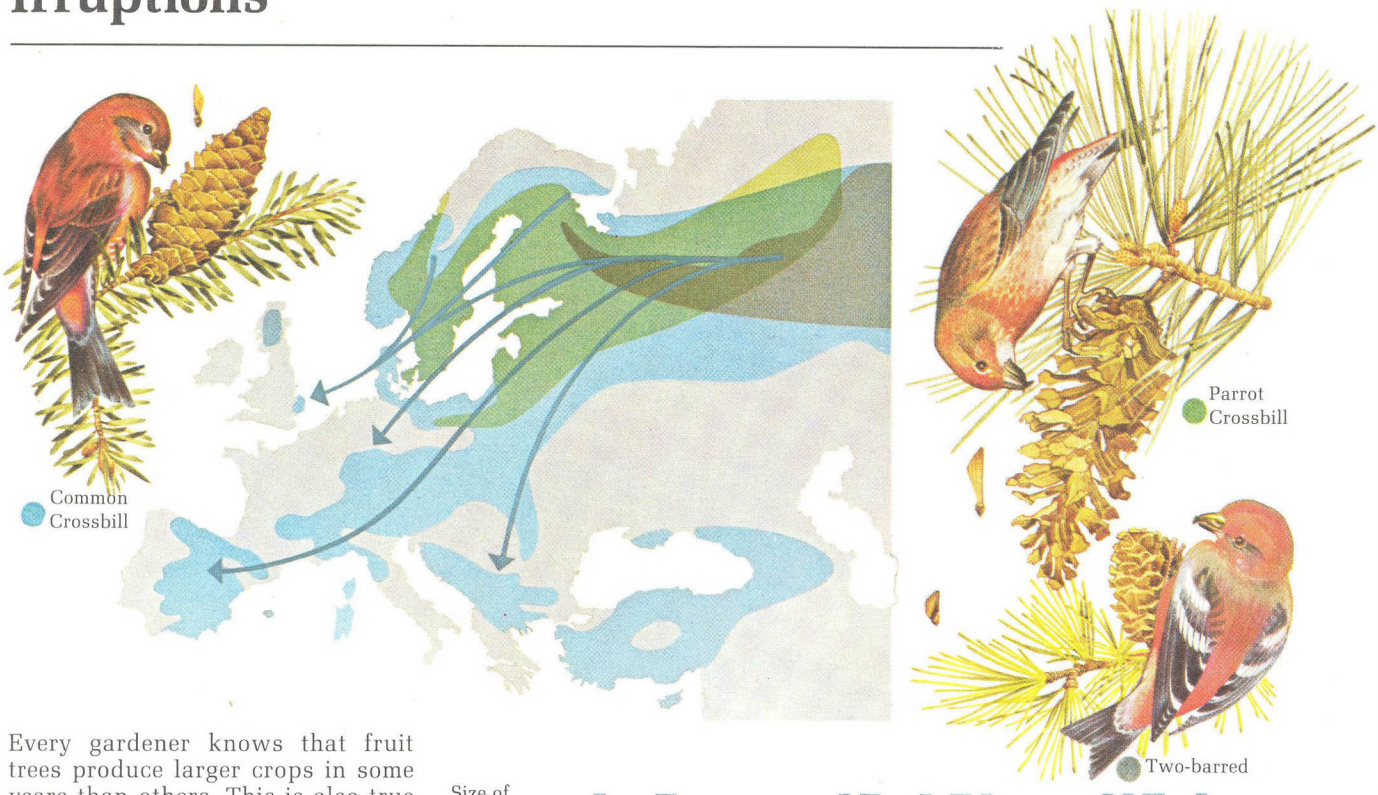
Crossbill



While in the nest, a brood of Crossbills may consume some 85,000 seeds extracted from fir cones by the specialized bills of their parents. This remarkable skill enables Crossbills to exploit a major food source inaccessible to other birds (except the less efficient woodpeckers) until the cones open. Falling spruce, larch and fir cones are attacked by the common Crossbill; heavier-billed northern birds, which tackle pine cones, are usually regarded as a separate species, the Parrot Crossbill. Falling cones and explosive calls are a sure sign that a Crossbill party is at work above: the bird will twist a small cone right off its stem before extracting the seeds, and then discard it. Cone crops fluctuate from year to year, thereby causing irruptions (see opposite page).

Breeding starts in February, and nests are built in groups, high in conifers. Males utter a twittering song, sometimes in display flight. The female incubates the three or four eggs, fed by the male, leaving the nest briefly and infrequently. Both parents feed regurgitated seeds to the young, which develop unusually slowly. The fledging period is 25 days, and fledglings are dependent for a further month or so until the crossed bill tip has developed. Later in the year, Crossbills of all ages take aphids, using the tongue because the twisted bill cannot grasp them. In winter, they will eat salt thrown on icy roads – which can be a fatal mistake when poisonous substitutes are used.

Irruptions

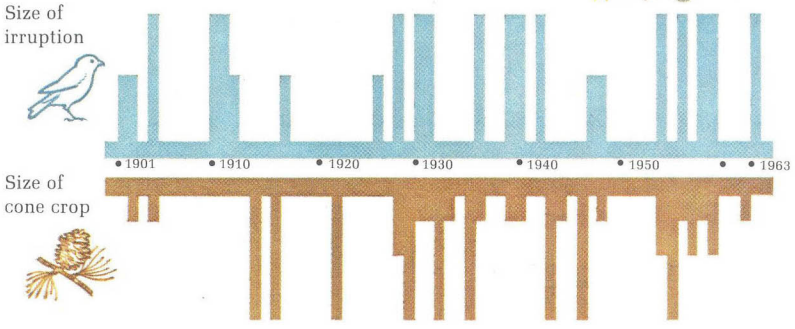


Every gardener knows that fruit trees produce larger crops in some years than others. This is also true of most wild trees. Both require longer than just 12 months to accumulate reserves for fruit and seed formation.

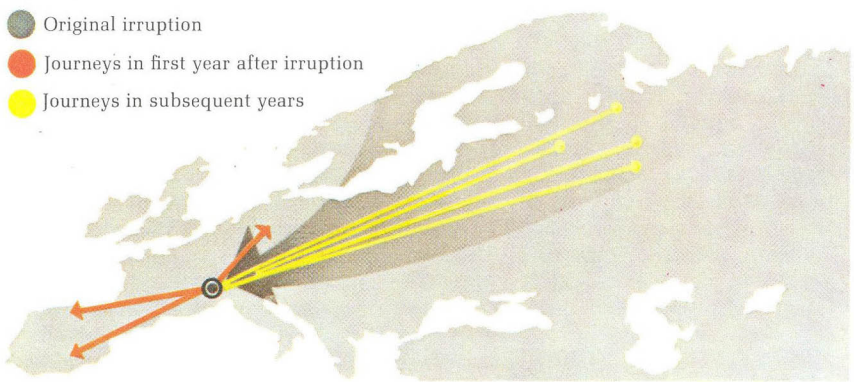
By contrast, herbaceous plants produce about the same amount of seed each year. The large number of birds which feed on herb seeds show small or insignificant fluctuations in their breeding populations: Linnets, for example, increase by at most 50 per cent from one year to the next.

A few species depend on trees for food. Their numbers show very marked fluctuations, which correspond to the size of the seed crops: Siskin and Redpoll populations, for example, increase by as much as four times between successive years. Such species differ from most birds by rarely migrating in a fixed direction. Instead, they cope with fluctuations in food supply by wandering until they find a new, more adequate feeding area. An influx of birds caused in this way is called an irruption.

Besides Siskins and Redpolls, other species showing well-marked irruptive movements include the Brambling, Pine Grosbeak, Waxwing and Redwing. Of all irruptive species, crossbills show the most specialized and sensational behaviour. Only in exceptionally lean years do they leave their breeding areas at all, and even then only one major movement is made in a single year.



Top: the Common Crossbill (which feeds mainly on spruce trees) has two other European counterparts, the Parrot Crossbill (which prefers pine) and the Two-barred (which prefers larch). All three irrupt mostly along the same routes into the same well-defined localities, with the exception of Common Crossbills from Scandinavia, which move to the United Kingdom. **Above:** the bar chart represents approximate sizes of Common Crossbill irruptions from Sweden between 1901 and 1963 and approximate levels of spruce cone crops in the same years. It shows that although many big movements coincide with poor crops, the two do not correspond exactly. Moreover, emigrations often start before the size of the new spruce crop has become apparent. Probably a high population level is necessary before emigration can occur, but once this level has been reached, the first inadequate crop will trigger an exodus. **Bottom:** after an irruption. Ringing experiments carried out in Switzerland suggest that some crossbills eventually return to their area of origin, but not until the second year after irruption. Unlike other birds away from their breeding ground, crossbills may raise young in the invaded areas



Fan-tailed Warbler

Fan-tailed Warblers are most conspicuous in their high, jerky song flight over marsh and farmland. The dry "zeep . . . zeep" is a good recognition point as the bird climbs into a blue Mediterranean sky

A side view shows the short, stocky build and alert posture. The plumage pattern is similar to that of the Sedge Warbler, but their physical characteristics differ

(×3/5)

An adult perches above the delicate, purse-shaped nest, made mainly of cobwebs, hidden deep in grass. The back markings are conspicuous on this freshly plumaged bird, but duller, worn specimens are frequently encountered.

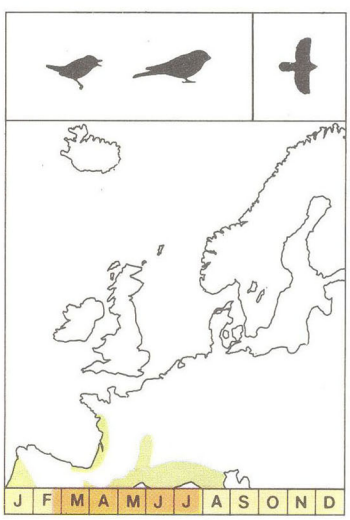
Rear view of bird skulking into the undergrowth

No other Warbler has the stubby wings and rounded tail which gives this bird such a characteristic profile in flight

The feathers on the underside of the short, very rounded tail have characteristic white tips—not easy to identify in the field

(×3/10)

Although skulking birds, Fantail Warblers can be seen frequently in areas they favour



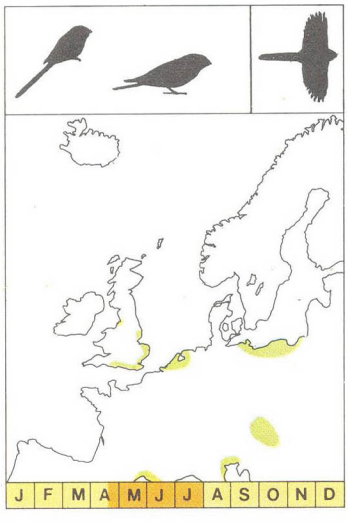
This tiny warbler, with drab, streaked plumage, is well suited for concealment against its surroundings of reeds or other vegetation. Nevertheless, it is often seen in its own habitat because of the male's conspicuous song flight: a surprisingly penetrating repetition of "zeep" calls. These are uttered as the bird bounces about on weakly fluttering wings, rising to 50 feet as if held on an invisible spring, undulating sharply with each "zeep". In many areas Fantailed Warblers have developed the habit of singing from roadside overhead cables.

The preferred habitat is reeds, salt scrub or other vegetation in marshy areas or by waterways, but Fan-tailed Warblers are also widespread in lowland scrub, on poor farming land, and often in apparently arid surroundings. In Europe it is a Mediterranean species, but it has an enormous range throughout the warmer parts of the Old World, and many close relatives occur in Africa. At present, populations are expanding northwards in Europe, breeding as far north as Brittany.

This bird builds a remarkable purse-shaped nest of cobwebs, reinforced with woven-in wisps of grass and lined with reed flowers and thistledown. It usually contains five bluish-white eggs, freckled with brown. Young in the nest are surprisingly noisy: both parents feed them and the male sometimes approaches while still singing—clues to an otherwise skilfully hidden nest.

Bearded Tit

R



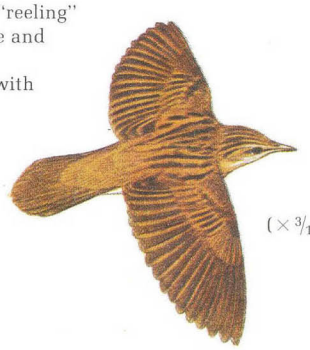
This elegant and charming bird has had a chequered history. Last century it was greatly persecuted by egg collectors, cage bird fanciers and others. Reprieved by protection, its populations recovered, though badly hit by occasional severe winters. Now it is expanding its range, and has colonized many new areas—notably in Holland (where reclamation has greatly enlarged its habitat), Germany and England.

Not a tit at all, this species is the only European representative of the huge babbler family of Asia and Africa. It is confined to beds of *Phragmites* reeds, where it takes insects in summer and *Phragmites* seeds in winter. On calm days, Bearded Tits may often be seen making short flights just above the reeds. Wind keeps them lower, but the "ping" call note betrays their presence. The nest is built near water level among reeds by both sexes, the male adding a lining, and five to seven eggs are laid. Both parents incubate and tend the young, which spend only nine to 12 days in the nest, often leaving while flightless. Up to four broods may be reared in a warm summer. Bearded Tit nestlings show a remarkable red, black and white pattern in the open gape, unlike any other European bird. Immature birds pair in their first autumn, and apparently maintain the pair bond for life. Once considered sedentary, it is now known to undertake extensive movements.

Grasshopper Warbler

When these birds produce their unique "reeling" song the head is turned from side to side and the beak is opened to reveal the yellow gape. The throat distends and vibrates with the effort—and so does the tail

Grasshopper Warblers often nest in young pine plantations



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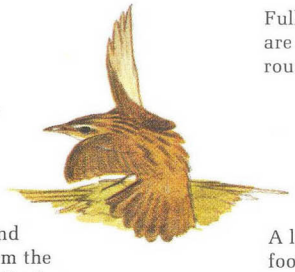
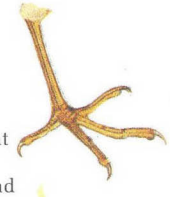
Full views of the bird in flight are rare, but they reveal a rounded tail and oval wings



Wing flicking and tail wagging form the male courtship display



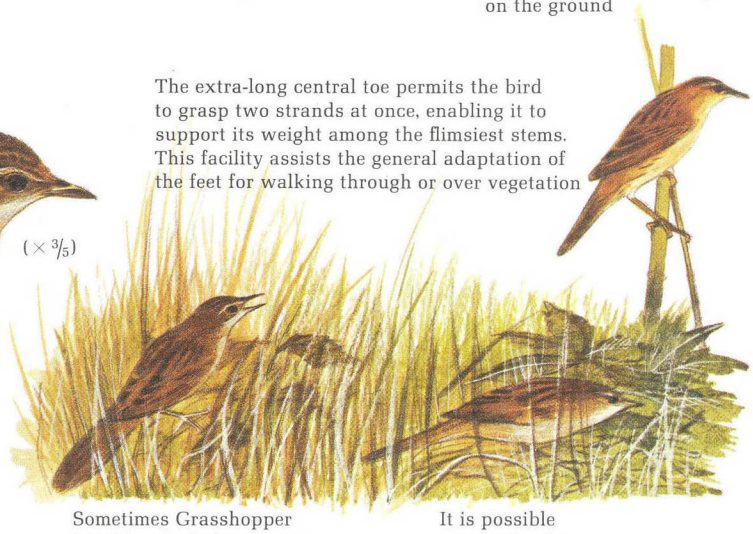
A long-toed foot—efficient for walking on the ground

There are streaks on the under-tail coverts

(×3/5)

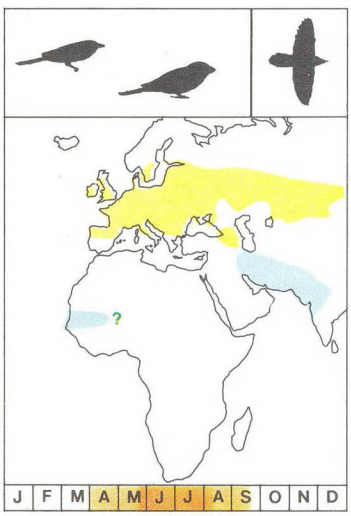
Rounded tail and streaked upperparts of uniformly plain colour—this is a nondescript bird

The extra-long central toe permits the bird to grasp two strands at once, enabling it to support its weight among the flimsiest stems. This facility assists the general adaptation of the feet for walking through or over vegetation



Sometimes Grasshopper Warblers look dumpy, at others remarkably slim

It is possible to mistake this bird for a mouse

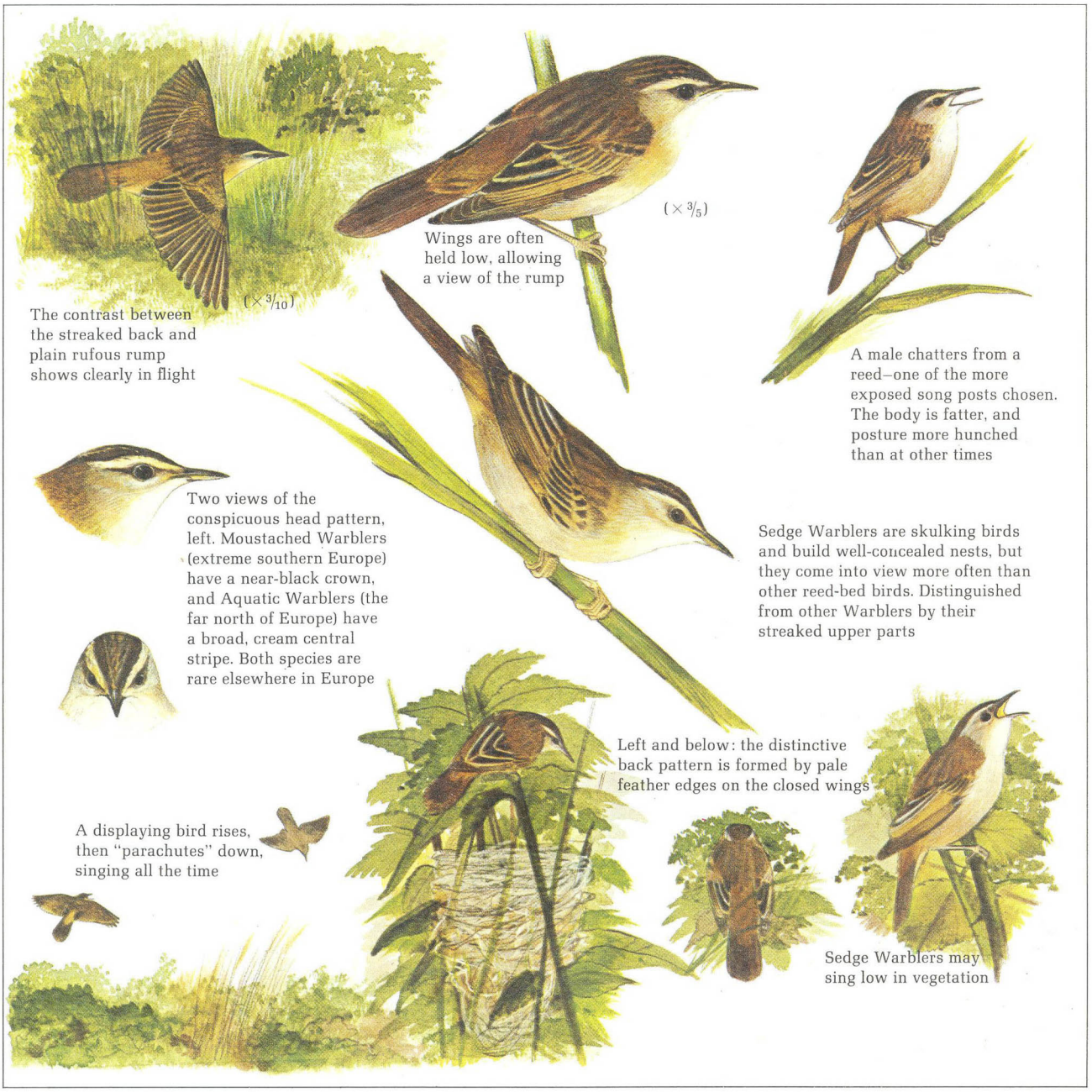


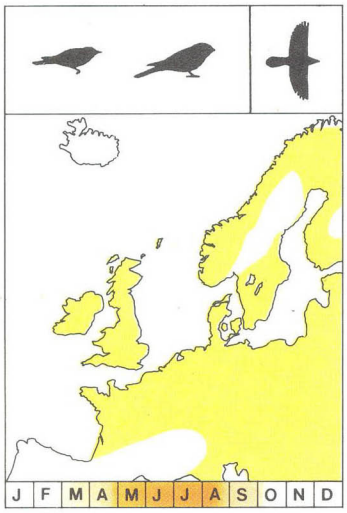
A bird that sings like an insect and behaves like a mouse, the Grasshopper Warbler is widely distributed but rarely seen. Any area of rough, rank grass or sedge is a likely habitat, but its presence often goes unsuspected. Song is the clue—a high-pitched trilling continued for two minutes or more at a time—but being ventriloquial it is difficult to locate.

Once the bird has been spotted singing—bill wide open and body vibrating—close approach is possible before it slips with astonishing speed through tangled undergrowth. Its skulking behaviour is aided by a foot with a relatively long central toe—ideal for walking or running and for grasping several stems at once, less good for grasping individual stems, as do Reed and Sedge Warblers. The female is all but invisible as she moves to and from the nest, which makes it difficult to find: searchers often walk one behind the other, since the bird slips off only after the first observer has passed. The nest is a simple cup of coarse grasses hidden deep inside a grass or sedge tussock. Five or six eggs are laid, prettily marked with dense, pinkish freckles. Two broods are usual.

Though more often seen on the ground than in flight, migrating Grasshopper Warblers are frequent casualties at lighthouses: hundreds have died in a night at some Irish Sea lights. Nevertheless, the species thrives and is extending its range.

Sedge Warbler



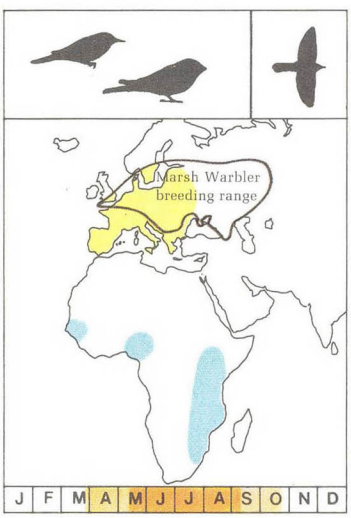


Commonest and most widely distributed of the European marshland warblers, Sedge Warblers frequent the dense vegetation along waterways and lakesides, as well as drier hedgerows and thickets. They are distinguished from most other reed-bed warblers by their streaked upperparts, dark crown and pale eyestripe.

Sedge Warblers spend much time low in vegetation, but can often be seen as they proclaim their noisy song, which is less repetitive than the Reed Warbler's. The deep, surprisingly bulky nest is well concealed, bound round stems in low vegetation, and holds four or five eggs. Two or three broods are usual.

Sedge Warblers winter in tropical Africa, and perform one of the most extraordinary of migration feats. Most migrants feed intensively before departure, storing energy as fat. Sedge Warblers take this to the extreme: they store fat in the body cavity, under the skin, even under the eyelids, some becoming almost spherical and having great difficulty in taking off. A few other species achieve pre-migratory weight increases of 30 per cent, but Sedge Warblers sometimes double their weight. Their store of energy is expended in a flight which traverses Mediterranean and Sahara in one hop. Recent drought conditions in western Africa seem to have affected the northward journey and Sedge Warbler populations have been considerably reduced.

Reed Warbler—Marsh Warbler



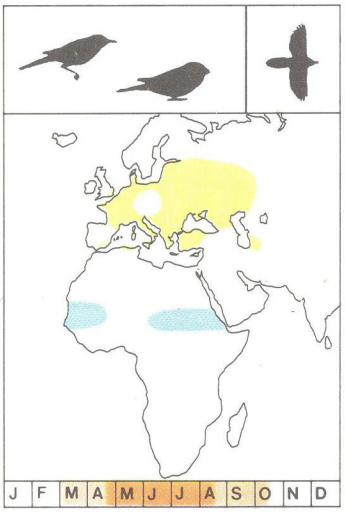
Reed Warblers' nests are renowned examples of bird architecture. Woven round a few reed stems, they are supported virtually by friction alone: there is no support beneath.

Reed Warblers arrive and breed late, most of their young being reared from June onwards. They almost invariably nest in beds of *Phragmites* reeds, from which the males deliver their harsh and repetitive song, reaching a crescendo during the two hours before dawn. The clutch of four is incubated by the female at night, and by both sexes during the day, when the female takes a 25 per cent larger share of this task than the male. Incubation starts with the second egg and lasts 11 to 12 days. The young are fed by both sexes, and at this stage parents often forage outside the reed beds, where saw-fly caterpillars on nearby willows are an important food source. They may leave the nest after as little as ten days, though it is a further week before they can fly. Frequently two broods are reared.

These birds do not show such spectacular pre-migration weight gains as Sedge Warblers, but make instead a refuelling stop in Iberia before crossing the Mediterranean and Sahara to tropical Africa. The main moult takes place in these winter quarters.

The confusingly similar Marsh Warbler differs from the Reed Warbler in habitat and behaviour. It lives in osier beds and marshy scrub, and males have a much more melodious song.

Savi's Warbler



Savi's Warbler is closely related to the Grasshopper Warbler, but, having unstreaked plumage, is more likely to be mistaken for the Reed Warbler. Its graduated tail and skulking, mouse-like behaviour should distinguish it from the latter.

Savi's Warbler occupies wetter habitats than the Grasshopper Warbler, and is thus more vulnerable to drainage of marshland. It is much more patchily distributed, though having recently started to breed in England after a century's absence its status is improving. The typical habitat contains a mixture of willows, sedges and reeds, and some open shallow water is essential. Its diet consists entirely of waterside insects. The song resembles the Grasshopper Warbler's "reeling", but is usually delivered in shorter bursts, starting with a few ticking notes, and the individual notes in the trill are produced more slowly. The female is said to sing at times and a ticking alarm call is commonly used.

A rather bulky nest is built into the base of a sedge or rush tussock. Consisting of reeds and grasses woven around the plant stems, it is sometimes slightly domed. Four or five brownish eggs are laid and incubated by the female, who is believed to be almost entirely responsible for feeding the young. The incubation period is 12 days, the fledging period 14 days, and it is usual for the species to raise a second brood.

Cetti's Warbler

Cetti's Warbler is unusual among passerines in having ten tail feathers rather than 12, which can give the strongly rounded tail a ragged appearance. In song, far right, it is often heard, but rarely seen except early on spring mornings

Occasional upward flicks of the tail characterize the Cetti's behaviour in vegetation. The bird is generally more like the Garden Warbler or Blackcap than other marshland Warblers

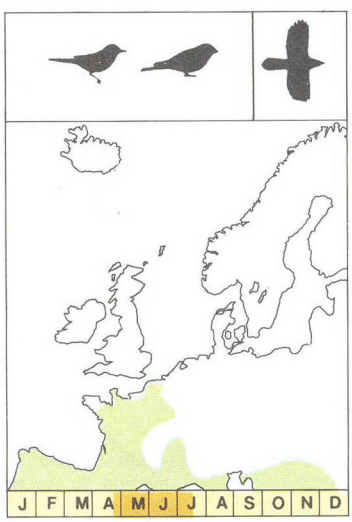
(× 3/5)

Cetti's is the only uniformly rufous-brown Warbler, contrast being added only by the off-white eye-stripe. The underparts vary from off-white to pale buff

An extreme skulker at all times, Cetti's Warbler feeds low in scrub. It nests close to the ground (or occasionally over water) in the dark depths of plants such as brambles. The eggs, a dark, purplish brown, are adapted to concealment and so are the young, which are covered in dark grey or black down

(× 3/10)

Dark, rich brown plumage and a long, rounded tail make identification of this Warbler easy

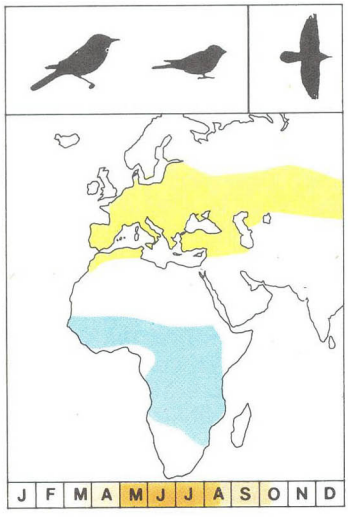


This rather large warbler shares with the Dartford Warbler the distinction of being non-migratory in the true sense of the term. Thus, it also shares the Dartford Warbler's vulnerability to severely cold or long-lasting winters, which can cause massive population "crashes", most noticeably at the northern edges of its range. It is primarily a Mediterranean bird, common and widespread in southern and central Europe, and the present sequence of mild winters has encouraged a rapid expansion of the Cetti's Warbler's range northwestwards. Steadily increasing numbers now breed in southeastern England, but the next cold winter may well extinguish them all, making the bird once again a rare vagrant in Britain.

Cetti's Warbler spends much time low in vegetation, but can normally be seen (with a little patience) simply by standing still in a favoured area. Males advertise their presence with a startlingly explosive burst of song.

The habitat is bushes and scrub along marshland and irrigation ditches, or by lakesides, but occasional pairs breed surprisingly far from water. The birds are usually seen as they flick low between clumps of vegetation – especially when feeding young. Males may sing in open view on calm mornings in early spring, when the almost thrush-like shape can be clearly seen. The rather bulky nest, built in deep vegetation, usually holds a clutch of four striking brick-red eggs.

Great Reed Warbler



An appropriately named bird which dwarfs the Common Reed Warbler. By far the largest of European Warblers, it is almost the size of the Song Thrush.

The Great Reed Warbler's plumage and general shape are similar to the Reed Warbler's, but the Great Reed Warbler may appear sandier when in worn plumage, and it has a longer, heavier bill. The flight is jerky, low over the reeds, and the long, rounded tail is partly fanned: it frequently crashes clumsily about as it moves through the reeds. The nest, woven round *Phragmites* stems, resembles the Reed Warbler's, but is bulkier, and four to six eggs are laid. Like the Reed Warbler, it is a frequent victim of the cuckoo.

Great Reed Warblers are widespread in continental Europe, especially in association with large reed beds, but never as numerous as their smaller relative. A rare bird in Britain, despite its abundance in nearby Holland, the Great Reed Warbler is expanding its range and may eventually breed here. It nests in sociable gatherings rather than colonies, with nests some distance apart.

Occasionally Great Reed Warblers will come into competition with, and drive off, Reed Warblers. Generally, areas with some open water are preferred, perhaps because water beetles, dragonflies and even small fish occasionally feature in their basically insect diet. In autumn they may fatten on sugar-rich berries before migrating.

Migration

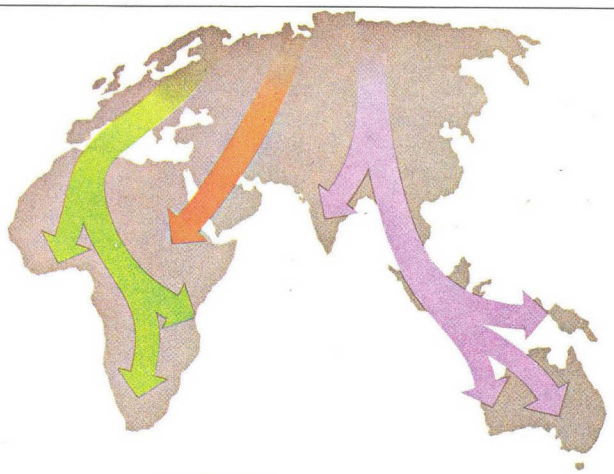
There is something uniquely poignant about bird migration, particularly that of such small passerines as the many song birds which visit Europe each summer in order to breed. During June and July, most of these species are hatching their young–tiny scraps of life, blind, unfeathered and totally helpless. Within say eight weeks these same youngsters will set off one evening on a journey of many hundreds of miles towards a wintering place they have never seen. Perhaps even more incredible, those which survive may well be back near their birthplace the following summer.

Distances covered may be vast. Many European breeding birds, such as Swallows or Sanderlings, pass the winter in South Africa, a journey of about 5,500 miles. Arctic Terns travel a minimum of 8,000 miles from northern breeding grounds to their wintering places in Antarctic waters. Such trans-equatorial migrants enjoy permanent summer.

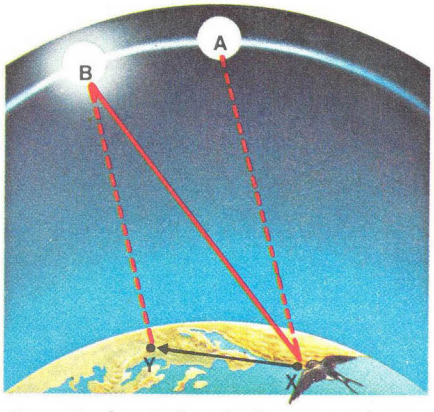
Of course, many birds are non-migratory, while others undertake only short movements, or more or less random dispersals from their point of origin. True migration involves regular movements between fairly well defined breeding and wintering areas, and its purpose is to ensure an adequate food supply at all times of year. Migration is confined to definite seasons, and should be distinguished from the weather movements which species such as the Lapwing or Redwing may undertake during hard weather.

Large birds generally migrate by day, but most small passerines travel at night–a safeguard against predators. Swallows and martins, which are day-time migrants, have protection in their flying skills. Very long journeys, like that of the Sedge Warbler (logged on the opposite page), last two days and nights.

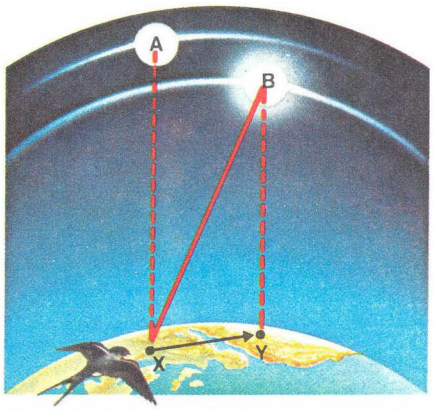
Migration only starts during good weather, with clear skies and little wind. It may be thwarted by squalls, fog or heavy overcast: a fine spell following prolonged bad weather may produce a rush of migrants that have been accumulating at some departure point. Even when conditions are fine at the start, they may deteriorate during the journey, and when migrants are flying without landmarks over sea, cross-winds may blow them far to one side of their intended route. In such cases, they will either make a landfall off course or perish at sea.



Major migration routes of the Old World: almost all species for which Europe and northern Russia are summer quarters winter in Africa or the Middle East. The exceptions are two less common species not included in this book, the Arctic Warbler and the Red-breasted Flycatcher. Both winter in the Far East. Most species spending the summer in eastern Asia winter in southeastern Asia and Australasia



Correcting longitude: a bird can remember the sun's position, A, along its east-west track for a given time at home. It realizes that the observed sun, B, is not in that position. By flying eastwards from its present position, X, it "speeds up" the sun until on the home longitude, Y, the sun is at its accustomed position



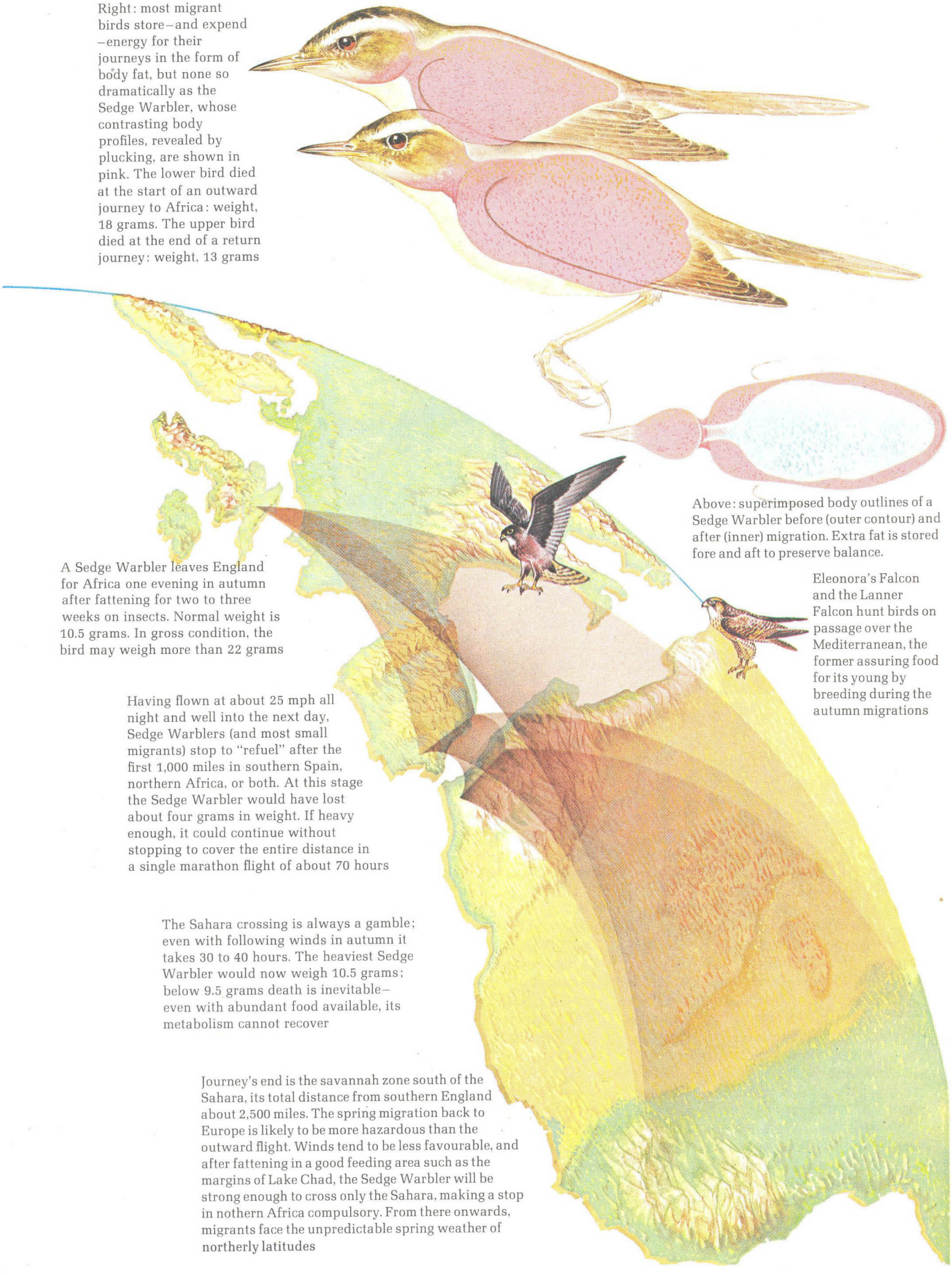
Correcting latitude: a bird can remember the elevation, A, of the midday sun at home. It can also see that the observed sun, B, is not climbing as fast as it did at home. By flying south from its present position, X, the bird causes the sun to "rise" until on the latitude of home the sun is at its accustomed height

Migrations, as opposed to dispersals, are made in a very definite direction, which is known instinctively and not in any way learned or copied from older birds. This is clear by a comparison of the timing of migrations made by old and young birds: among many passerines, birds of the year set off first, while their elders moult into new plumage. Conversely, young Cuckoos migrate alone, well after the departure of their true parents, whom they never meet.

How birds determine their course, often over trackless stretches of sea, has been a source of much speculation. At present the most plausible theories are based on the role of the sun or stars.

The simplest form of navigation is that shown by a bird migrating in a fixed direction, as so many do. By day, the sun's position in the sky provides a compass orientation as long as the time of day is known, and there is good evidence that birds have accurate internal "clocks" for that purpose. This is shown by experiments with caged birds in a state of migratory restlessness, when they tend to flutter most in the direction they want to go; artificial suns and artificial alterations of day length produce the expected changes in direction. Similar results are obtained with night migrants caged under a starry sky, or even a planetarium. This need for visual clues explains why fog or heavy overcast can bring migration to a standstill.

Even more remarkable and intriguing is the capacity for homing, shown for example by the Manx Shearwaters transported from Wales to the USA which returned to their burrows in $12\frac{1}{2}$ days. Orientation towards a definite goal from any direction requires the bird to know both its own position on the Earth's surface and that of the goal. Though other possible clues, such as magnetism or the Earth's rotation, have been considered, in these cases the sun is the most feasible.



Right: most migrant birds store–and expend –energy for their journeys in the form of body fat, but none so dramatically as the Sedge Warbler, whose contrasting body profiles, revealed by plucking, are shown in pink. The lower bird died at the start of an outward journey to Africa: weight, 18 grams. The upper bird died at the end of a return journey: weight, 13 grams

Above: superimposed body outlines of a Sedge Warbler before (outer contour) and after (inner) migration. Extra fat is stored fore and aft to preserve balance.

A Sedge Warbler leaves England for Africa one evening in autumn after fattening for two to three weeks on insects. Normal weight is 10.5 grams. In gross condition, the bird may weigh more than 22 grams

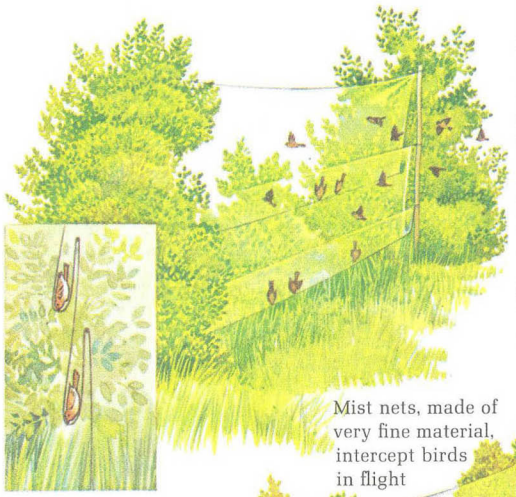
Eleonora's Falcon and the Lanner Falcon hunt birds on passage over the Mediterranean, the former assuring food for its young by breeding during the autumn migrations

Having flown at about 25 mph all night and well into the next day, Sedge Warblers (and most small migrants) stop to "refuel" after the first 1,000 miles in southern Spain, northern Africa, or both. At this stage the Sedge Warbler would have lost about four grams in weight. If heavy enough, it could continue without stopping to cover the entire distance in a single marathon flight of about 70 hours

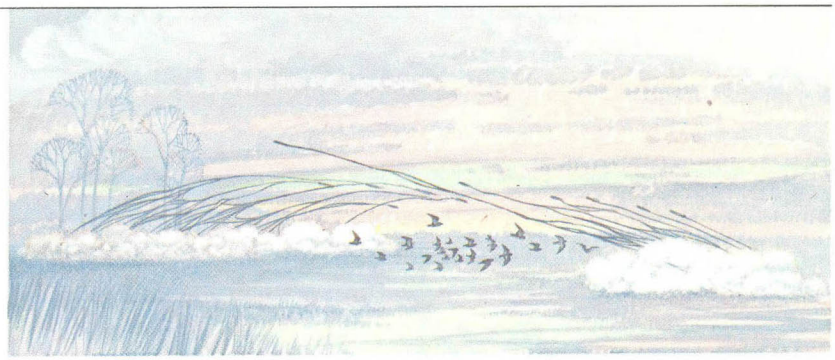
The Sahara crossing is always a gamble; even with following winds in autumn it takes 30 to 40 hours. The heaviest Sedge Warbler would now weigh 10.5 grams; below 9.5 grams death is inevitable– even with abundant food available, its metabolism cannot recover

Journey's end is the savannah zone south of the Sahara, its total distance from southern England about 2,500 miles. The spring migration back to Europe is likely to be more hazardous than the outward flight. Winds tend to be less favourable, and after fattening in a good feeding area such as the margins of Lake Chad, the Sedge Warbler will be strong enough to cross only the Sahara, making a stop in nothern Africa compulsory. From there onwards, migrants face the unpredictable spring weather of northerly latitudes

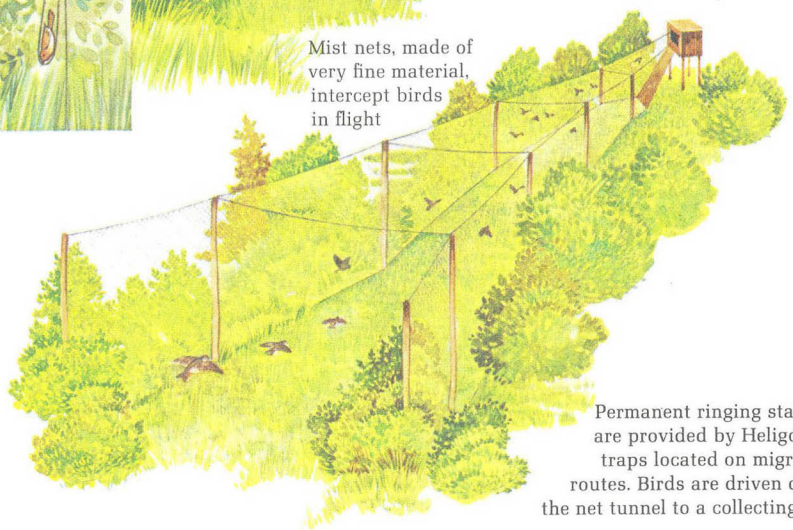
Ringing



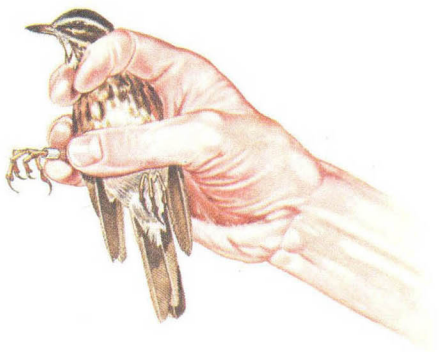
Mist nets, made of very fine material, intercept birds in flight



Cannon nets are used to catch waders or wildfowl at roosts. They are carried over the birds by projectiles fired from small cannons



Permanent ringing stations are provided by Heligoland traps located on migration routes. Birds are driven down the net tunnel to a collecting box



The correct grip prevents the bird from struggling and harming itself, allowing thumb and fourth finger to control the ring leg

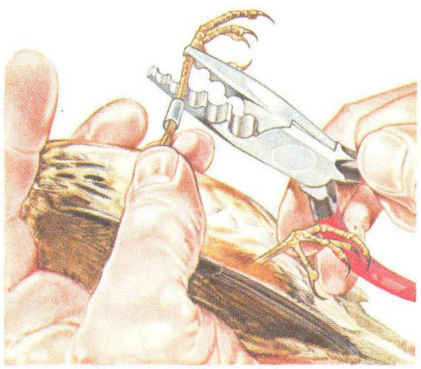
All Robins look the same, even to an experienced observer, but by ringing, each becomes an individual subject for study.

The technique consists quite simply of placing around the bird's leg a ring bearing a unique number, and an address to which its discovery should be reported. As a refinement, colour rings are used for certain types of investigation, the colour codes being distinguishable through binoculars, thus eliminating the need for trapping birds in nets before checking their rings. Of course, the number of possible colour permutations is limited and the use of colour rings is normally confined to populations which are both local and resident.

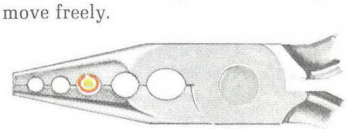
Ideally, all birds should be ringed as nestings, so that age and birthplace are known exactly. Breeding seasons are short, however, and most birds are ringed while fully grown and able to fly freely.

Most of the facts about migration mentioned in this book have been revealed by ringing, and so has a great deal about life expectancy and mortality. It has been found, for example, that most small passerines live a maximum of eight to 11 years, and that their average life expectancy at hatching is under two years. Larger species live longer, and the present record for longevity in the wild is held by a German-ringed Oystercatcher which lived into its 34th year. Ringing has shown that mortality is highest in the first year of a bird's life and subsequently levels off, although such factors as severe winters may lead to sharp increases. Ringing also provides a valuable check on the impact of these environmental changes on bird populations. Trapping birds for ringing provides opportunities to carry out additional studies, for instance on weight changes during migration, moult condition, presence of parasites and the changing colours of eyes, bill and beak.

Rings are made of light alloy, and their presence in no way hinders the life of a bird. This is essential on scientific, as well as humanitarian, grounds, for there must be no bias in results. The bird's interests always come first, and because of this, a high standard of skill is demanded of the ornithologists—mostly amateur—who carry out the work. Before a ringer is permitted to operate on his own, he must complete a period of thorough training and apprenticeship.



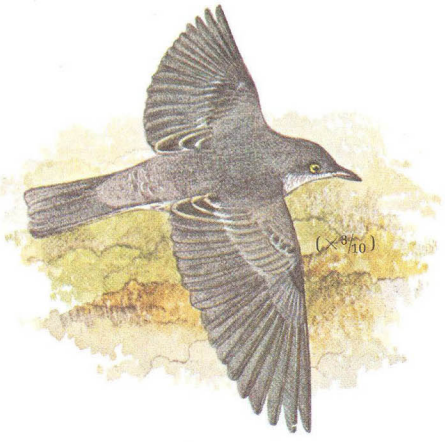
A ring is always fixed around the bird's tarsus above the foot, just loose enough to move freely.



Specially designed pliers are used to tighten the ring enough to ensure complete closure without risk of harm to the bird

Below, actual size rings ranging from those for Goldcrests and other tiny birds to those suitable for larger owls

Barred Warbler



The Barred Warbler's extraordinarily large size – even compared with the Great Reed Warbler – its long wings and tail, the striking pattern on the underparts and overall grey colour make it an easy bird to identify. In certain lights the grey of the plumage can appear exceptionally pale

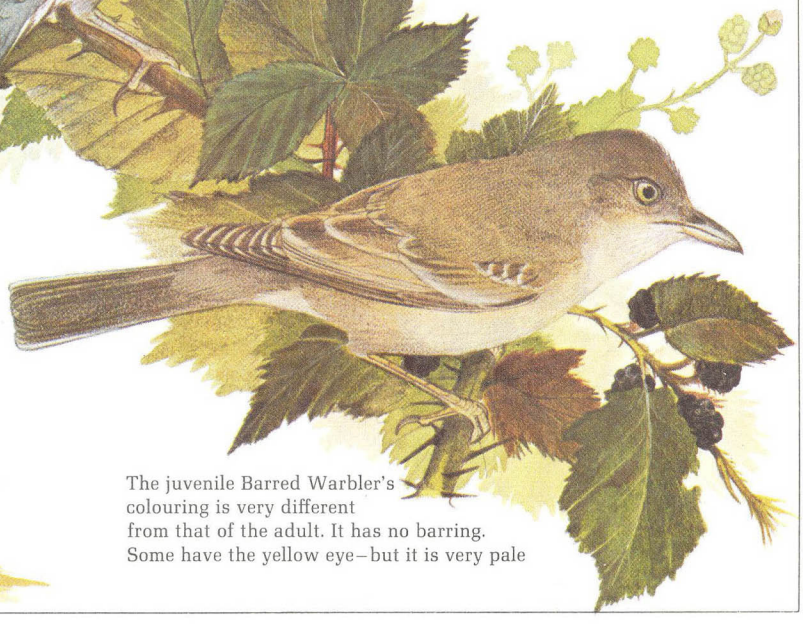
Typical Barred Warbler postures including the cocked tail

An adult male, right. The female is practically identical. In no other species do the large size, long, square-ended tail and heavy bill combined with a pale eye all occur together

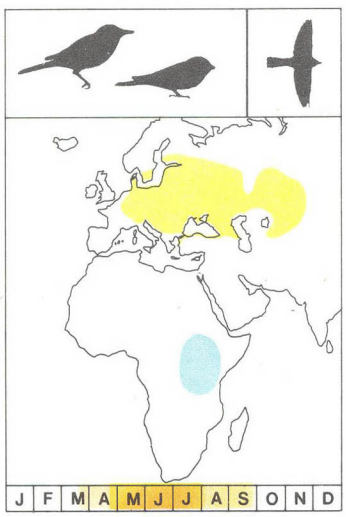
The yellow of the eye can vary individually from bright to pale, but combined with the large beak and inimitable expression makes this species unmistakable. Barred underparts are unusual in a passerine

The juvenile bird is brown. It has a profile, and habits, identical to those of the adult bird

Birds pausing on migration may lurk in scrub along coasts. Often, all that is seen of the bird is a peeping head and a baleful, yellow eye



The juvenile Barred Warbler's colouring is very different from that of the adult. It has no barring. Some have the yellow eye – but it is very pale



Large size and heavy build distinguish the Barred Warbler. The heavily barred flanks of summer plumage are also distinctive, but birds in their first autumn show little barring, and but for their size might be confused with Garden Warblers. Narrow greyish wing bars and pale-tipped tail assist identification in all plumages, though the former may be lost by abrasion.

During the breeding season, Barred Warblers occupy a variety of scrubby habitats, including forest glades, woodland edges and tall hedgerows. There is also a marked inclination to choose sites near water. These preferences are shared by the Red-backed Shrike, and there is a distinct tendency for the two species to associate, despite potential danger for the warbler. This association is even noted on migration, but its causes are difficult to surmise.

The male has a conspicuous song flight resembling the Common Whitethroat's, but Barred Warblers are generally skulking birds. The song is like the Blackcap's in tone, but briefer, and includes some scratchy phrases. Calls, given from deep cover, include a "chack" note like the Blackcap's and a "churring" note recalling the Nightingale. The nest is often placed quite high in some dense bush, and a single brood is usual. Food includes soft-bodied arthropods and berries in autumn. Larger fruits, such as apples and pears, are also attacked on occasions. The African winter quarters are in acacia scrub.

Wood Warbler—Bonelli's Warbler

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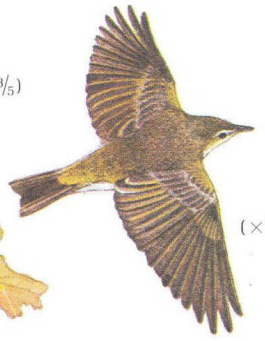
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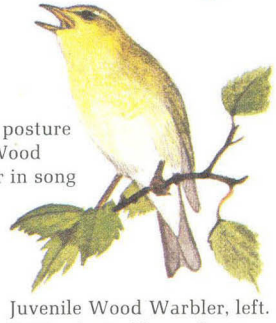
Bonelli's Warbler is best recognized in the field by its yellow shoulder patch, grey-green upperparts and yellowish tail. The yellow rump, not always visible, is also a distinguishing characteristic most often seen in flight

A Wood Warbler in display flight. The yellow under-plumage is distributed over its throat, breast and the leading edges of the wings

Seen from beneath, Bonelli's Warbler has a silvery white throat and breast, separating it from the Wood Warbler


Typical posture of the Wood Warbler in song

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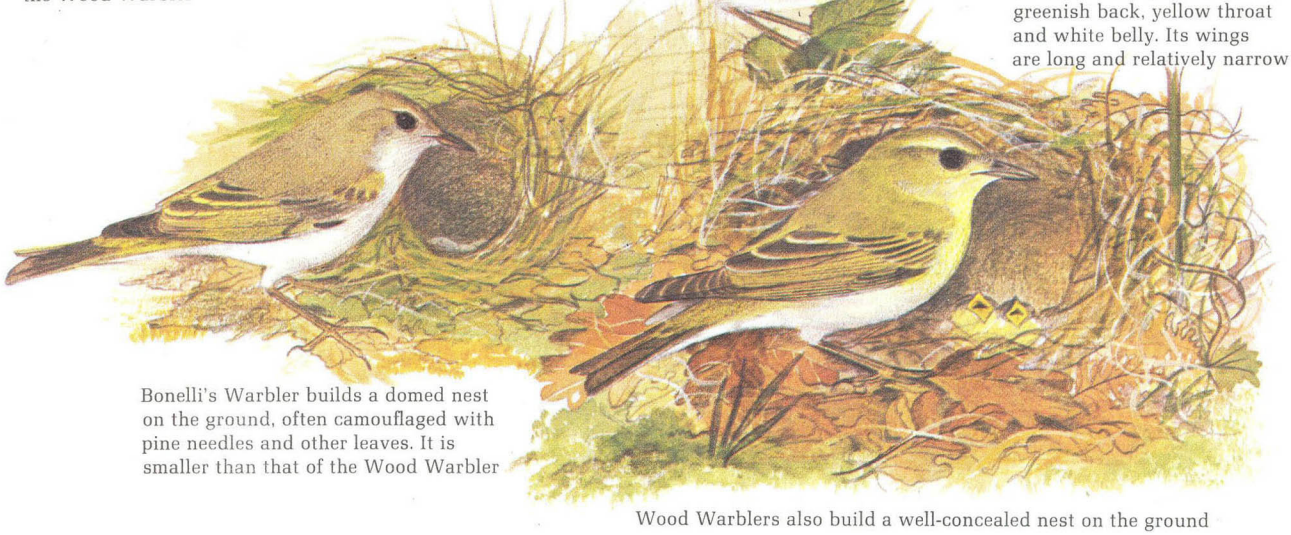
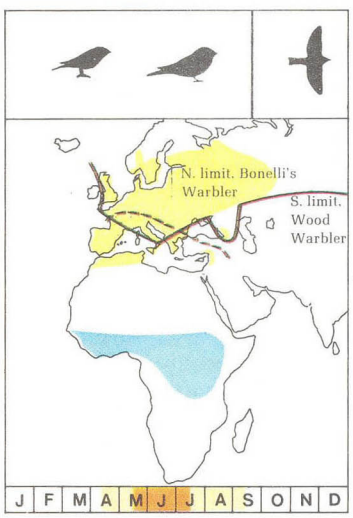
Juvenile Wood Warbler, left. A Wood Warbler is distinguished from Bonelli's Warbler by the larger eyestripe (which can vary in size), greenish back, yellow throat and white belly. Its wings are long and relatively narrow


Bonelli's Warbler builds a domed nest on the ground, often camouflaged with pine needles and other leaves. It is smaller than that of the Wood Warbler

Wood Warblers also build a well-concealed nest on the ground



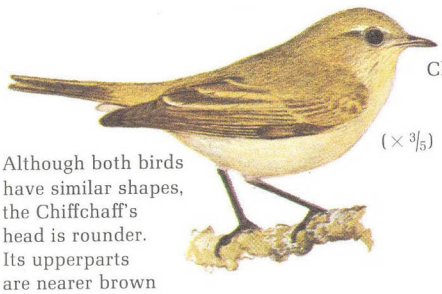
The Wood Warbler is the largest of the European leaf Warblers, and the most brightly coloured, with distinctive yellow-green upperparts, yellow breast and bright white belly. The song is a wonderful shivering trill, uttered with wings and tail vibrating, or sometimes in flight between perches. Song accompanies the butterfly-like display flight, when the male spirals down to a perch alongside his mate. There is a second quite different song – a repeated piping whistle – used about once every dozen trills.

In Europe, Wood Warblers are most often found in mature woods of oak and beech, preferably with sparse undergrowths. They spend most of their time high in the canopy, but build their nests on the ground. These are domed structures, with side entrances, often sunk in hollows. They lack the feather lining used by Willow Warblers and Chiffchaffs.

Bonelli's Warbler is a more southerly species, typical of Mediterranean hillside pinewoods and cork oak. Recent records indicate that it is increasing its range northwards. Its song is a trill somewhat like the Wood Warbler's, but lower pitched. The nest is similar, also lined only with grasses. The clutch, usually five, is smaller than the Wood Warbler's, but in both species a single brood is usual.

Both species winter migrate to Africa, but few details of the routes used are yet known.

Willow Warbler—Chiffchaff



Chiffchaff

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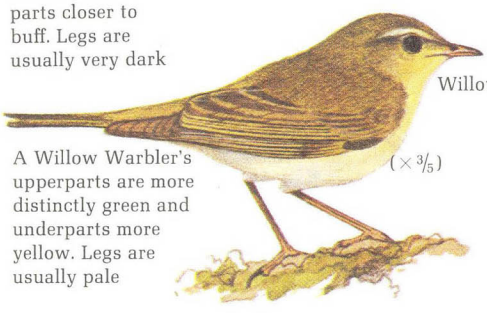
Although both birds have similar shapes, the Chiffchaff's head is rounder. Its upperparts are nearer brown and the underparts closer to buff. Legs are usually very dark

Flight silhouettes hardly differ, but the Willow Warbler, left, shows longer wings than the Chiffchaff. Both species feed in the same manner, working actively high in the canopy, but also flycatching and hovering to pick insects from under leaves



Willow Warbler

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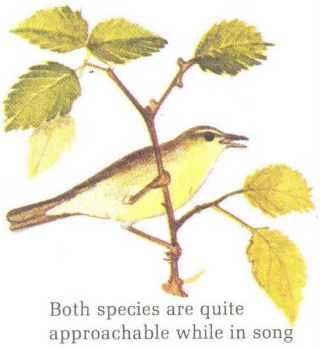
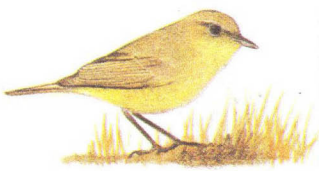
A Willow Warbler's upperparts are more distinctly green and underparts more yellow. Legs are usually pale



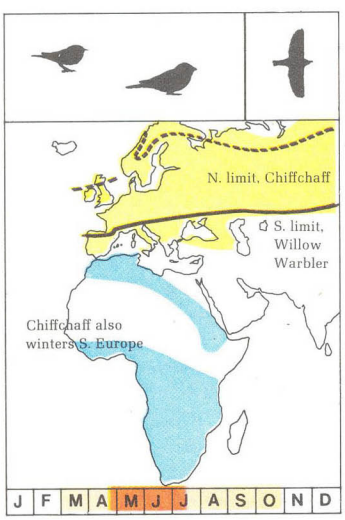
Both species are quite approachable while in song

The wings are often flicked as the alarm call is given



A freshly fledged Chiffchaff, left, is all but indistinguishable from a freshly fledged Willow Warbler, but much yellower than an adult. The northern forms of Chiffchaff, centre, and Willow Warbler, below left, generally have browner upperparts and white underparts

Chiffchaffs build ragged nests, right, almost always placed above the ground, whereas Willow Warblers make weaker structures, left, placed in grass actually on the ground. Both nests resemble those of the Wren, comprising a domed roof and side entrance



First distinguished (along with the Wood Warbler) by the eighteenth-century naturalist Gilbert White, these two birds are still best identified by song. The Chiffchaff continually sings its name, while the Willow Warbler has a sparkling, descendant cascade of notes. Calls, too, are distinguishable, the Willow Warbler's much more disyllabic. Silent birds are often perforce noted by the observer simply as "Willowchiffs".

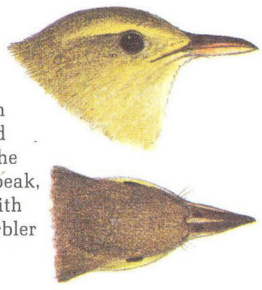
The Chiffchaff's legs are usually black, the Willow Warbler's pale brown, but doubtful cases occur. In the hand, shape and length of primary feathers distinguish most individuals. Generally, Willow Warblers are longer-winged and slightly larger birds.

Differences in habitat are not clearly defined, but Willow Warblers generally occupy more open areas, and take to tall trees only where there is copious undergrowth. They penetrate far to the north in low birch scrub. Chiffchaffs prefer tall, mature woodland with less dense undergrowth. In western Europe generally, the Willow Warbler is considerably more abundant and in many woodland or scrub areas is the most numerous bird in summer.

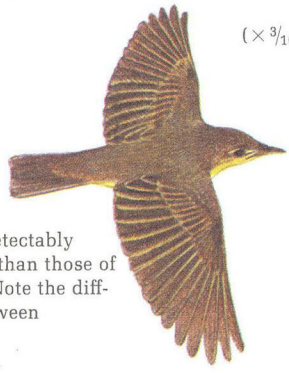
Though both birds efficiently conceal their nests (a Willow Warbler's on the ground, the Chiffchaff's slightly above it), they betray them when feeding the young by giving repeated alarm calls—a warning which picnickers should heed, and then move on.

Icterine Warbler

A singing male often raises his crown feathers – as do both sexes when excited in display. Normally, Icterine Warblers are flat crowned and long beaked – reminiscent of Reed Warblers



Views of head from right-hand side and from above show the broad base of the beak, a feature shared with the Melodious Warbler



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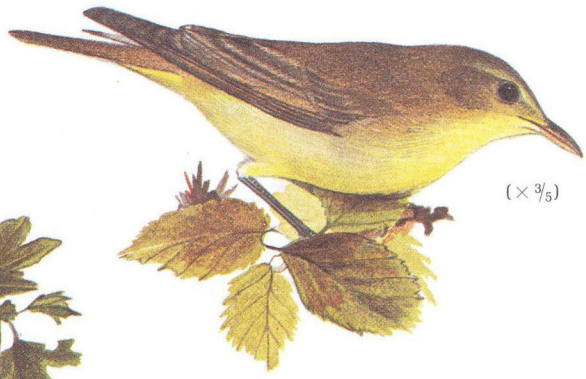
In flight, the wings are detectably longer and more pointed than those of the Melodious Warbler. Note the differences in tail length between the two species

A fully grown juvenile is bright yellow underneath

In late summer, Icterine Warblers take berries, tugging them off with a highly distinctive backwards jerk of the head

Excellent points of recognition in the field are the long, protruding tips of the folded wings which extend to roughly half the length of the tail. So also is the pale, oblong patch on the wing

The bird on the right is a juvenile, much yellower than the adult on the left and without the pale wing-patch. Its tail is not yet fully grown



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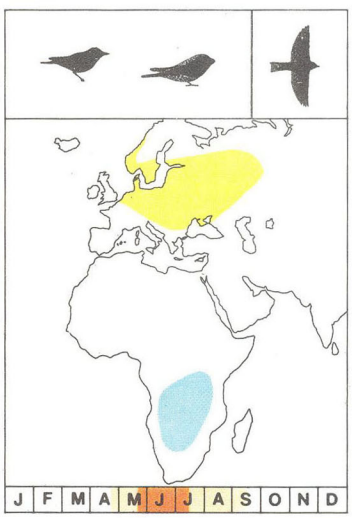
Migrating Icterine Warblers seen in autumn tend to have drabber, worn plumage, but the pale wing pattern is usually still distinct and the long wing-tips remain a reliable distinguishing feature



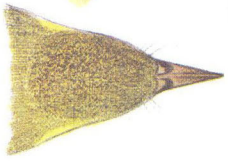
Pliny, the Roman encyclopaedist, mentions in his *Natural History* that a glimpse of the Icterine Warbler could cure a person suffering from jaundice. Presumably the superstition was connected with the bright yellow colour of the bird's underparts, and this curious idea is commemorated in the English and scientific names of the bird, which derive from the Greek *ikteros*, meaning jaundice.

Icterine Warblers are found in a variety of habitats, including parks, gardens and hedgerows, but generally keep to the tree canopy rather than the undergrowth beneath it. The typical nest site is six to eight feet up on a fork in the branches of a tree or bush. Both sexes build the nest, which is a neat cup of grass and roots lined with hair or feathers. Small scraps of paper or bark are often studded round the outside. Four or five eggs are the usual clutch, incubation and fledging periods each lasting 13 to 14 days. The duties of brooding eggs and feeding young are shared by both sexes; only a single brood is reared.

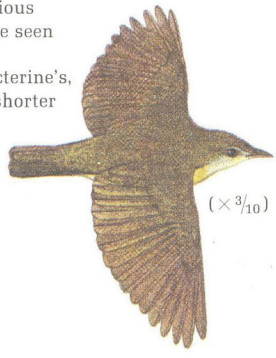
Harsh, grating noises interspersed with rich musical notes comprise the song, and, as with the Melodious Warbler, mimicry of other species is often included. The song is usually delivered from a regular perch, though sometimes in flight, and it is occasionally heard at night. The preferred habitats in winter quarters are cultivated land and palm groves.

Melodious Warbler

The long, broad beak is similar to the Icterine Warbler's, opposite page, but the head shape is normally flatter



In flight, the Melodious Warbler's wings are seen to be broader and rounder than the Icterine's, and the tail much shorter



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Bird in parachute display flight, similar to the Tree Pipit's

Melodious Warblers may emerge to sing on the sun-lit fringes of bushes, but spend most of the time deep in shrub cover

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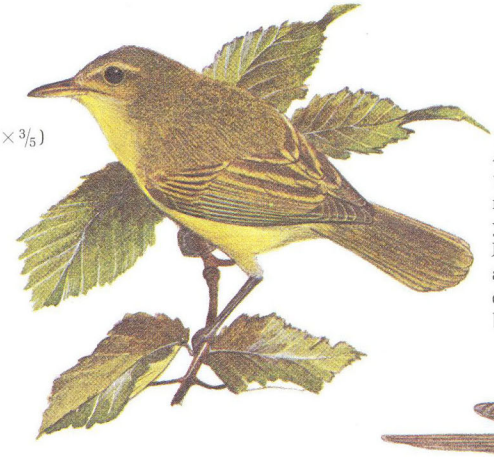
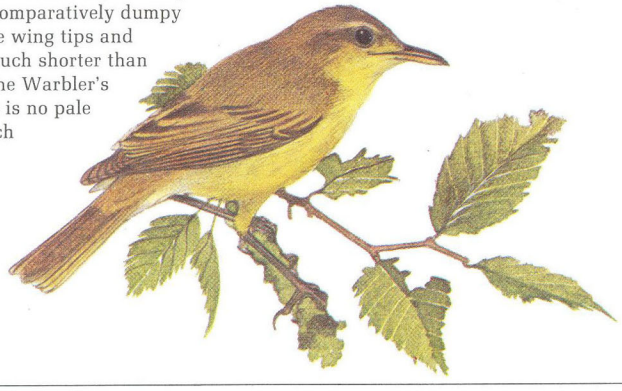
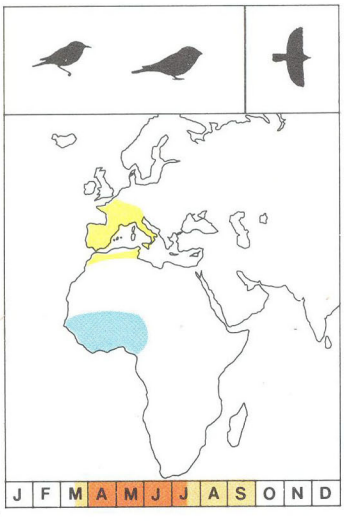


A juvenile is even yellower than an adult. The combination of green and bright yellow separates the Melodious and Icterine from all other Warblers. Leg colour ranges from lead blue to dark brown

Melodious Warblers are heavy headed, comparatively dumpy birds. The wing tips and tail are much shorter than the Icterine Warbler's and there is no pale wing patch



Some adults show very worn plumage, but can still be recognized by physical characteristics



As the name suggests, this species has a genuinely tuneful song, lacking the harsh notes produced by the closely related Icterine Warbler. The song is sometimes continued for several minutes without pause, and often includes passages mimicking songs of other species. Other vocalizations include a sparrow-like chatter. The song is generally delivered from an exposed perch, revealing the striking orange gape, but also in flight, and there is a parachuting song flight recalling the Tree Pipit's.

The Melodious and Icterine Warblers show close similarity in colouring, and probably share a recent common ancestor. The last Ice Age is thought to have finally separated the two, leaving the Melodious in the south and the Icterine in the north. There is little overlap in range, or competition, between the two species, which are separated by habitat preferences. Although both are birds of deciduous woodland edges and glades, Melodious Warblers like dense scrubby cover beneath the trees, rather than their upper branches. This preference enables the Melodious Warbler to breed in lush gardens and parks, and also in overgrown citrus and fig orchards. The nest resembles the Icterine Warbler's, but is built low, in deep cover: brambles, oleander or hedgerows are common sites. Incubation is by the female alone, but both sexes share the burden of feeding the young. Incubation and fledging periods are each 12 to 13 days.

Blackcap

The adult male with its distinctive black cap. Nape and breast are grey, upperparts are a plain olive-brown and there is a pale patch on the belly

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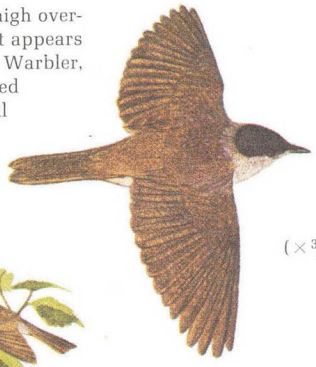
When this bird crosses high overhead between tall trees it appears very similar to a Garden Warbler, but it can be distinguished by its longer, slimmer tail



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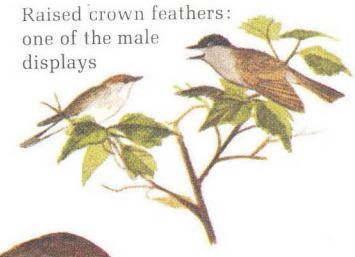
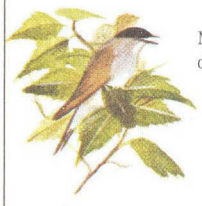
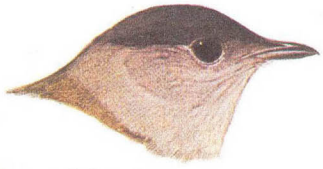
Raised crown feathers: one of the male displays



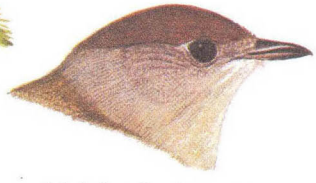


Males sing deep in foliage

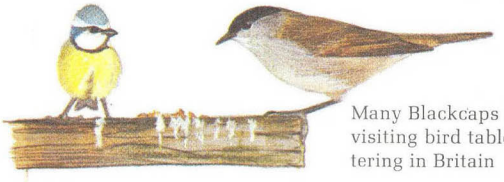
The female has a brown cap. There is also a touch of brown on the otherwise grey breast. Her nest is a neat structure of fine twigs and rootlets



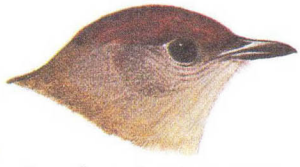
Adult male



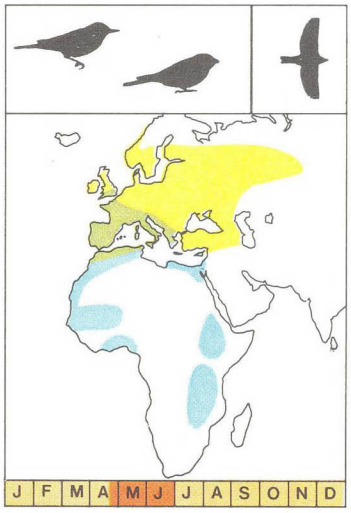
Adult female – brown cap



Many Blackcaps have taken to visiting bird tables when wintering in Britain



Juvenile – rufous-brown cap

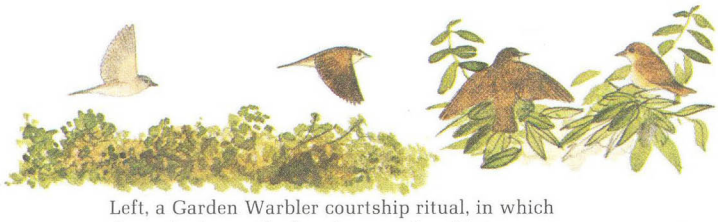


The melodious song of the Blackcap is commonly mistaken for the Nightingale's by the inexperienced, and for the Garden Warbler's by the more knowledgeable. However, it lacks the deep bubbling and long-drawn piping of the Nightingale's, and is briefer and richer than the closely related Garden Warbler's. A glimpse of the crown immediately distinguishes it from the latter.

Blackcaps favour more wooded habitats than Garden Warblers, often occupying areas with tall trees and sparse undergrowth. Where felling operations create a choice of environments, Blackcaps colonize territories with mature timber, Garden Warblers the scrubbier regions undergoing regeneration.

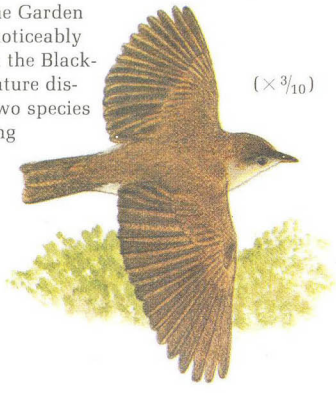
Nests, on average, are higher than Garden Warblers', but the two are similar, neatly woven structures of dry grasses. Five eggs are usual, and both sexes share incubation and feeding duties. Second broods occur mainly in the southern part of the range. Before autumn migration, adults moult completely, and juveniles moult body feathers, replacing dull brown caps with chestnut or black according to sex. Like many warblers, diet changes before migration from insects to fruit because its sugar content is easily converted into fuel reserves of fat. In southern countries, figs are favoured and several European languages name the bird "fig-eater". Autumn Blackcaps often show purple stains round the vent – the remains of elderberries or blackberries.

Garden Warbler



Left, a Garden Warbler courtship ritual, in which the male chases the female around and into the undergrowth. Right, a more static display – the male opening his wings to the female

Seen in flight, the Garden Warbler has a noticeably shorter tail than the Blackcap, and this feature distinguishes the two species when on the wing



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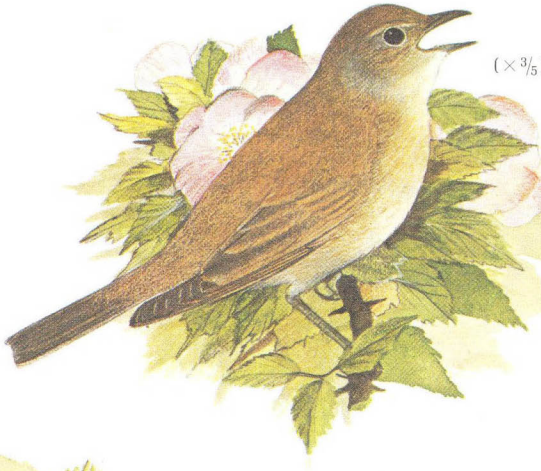
Adult



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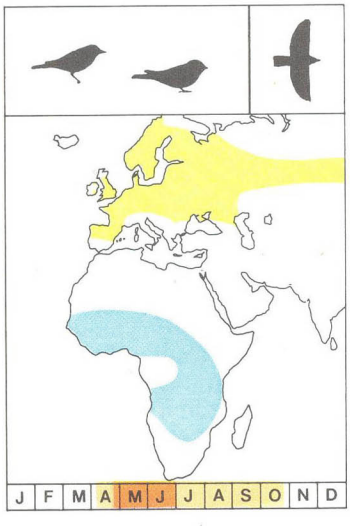
On first impression this seems the plainest of birds, but it has its distinctive features: the head is rounded; the bill unexpectedly short; there is a pale eyestripe and eye-ring and a subtle patch of grey on the neck. The face bears a distinct expression, for which the vacantly staring eye must be partly responsible

Juvenile

The juvenile bird is very similar to an adult, having the grey neck patch – but there is a yellowish cast to its plumage

The female on her nest, which is placed low in a bush



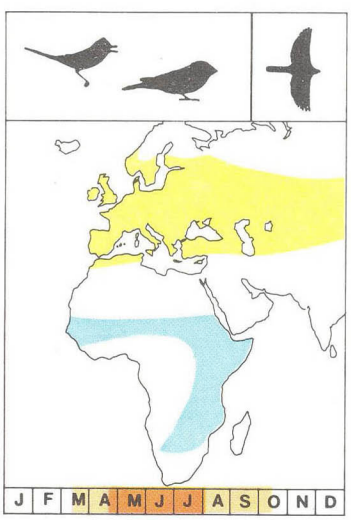
Perhaps Europe's most nondescript bird, yet one of its most abundant summer migrants, the Garden Warbler is closely related to the Blackcap, but lacks its distinctive head colouring. It has most commonly been confused with the Willow Warbler and Chiffchaff or the Reed and Marsh Warblers. However, the former are smaller, with distinct eyestripes, and the latter have a quite different head shape. The Garden Warbler's song is entirely distinct from other birds', but easily confused with the Blackcap's. Usually the Garden Warbler sings in longer, less musical bursts.

The similarity between Blackcap and Garden Warbler extends to nest and eggs, which are difficult to distinguish reliably without seeing the bird – though Garden Warbler nests are usually less neat, and placed lower. The main difference is habitat, which is often much more open than the Blackcap's, extending into the birch scrub zone.

Garden Warblers share with Blackcaps and other *Sylvia* Warblers the habit of making "cock's nests", frailer in structure than the one actually used to hold the eggs. Both sexes share in rearing the young, which leave the nest after only some ten days, several days before they can fly.

Garden Warblers arrive later than Blackcaps and, like them, leave early. They moult in winter quarters throughout Africa, showing no tendency to overwinter in the north.

Whitethroat

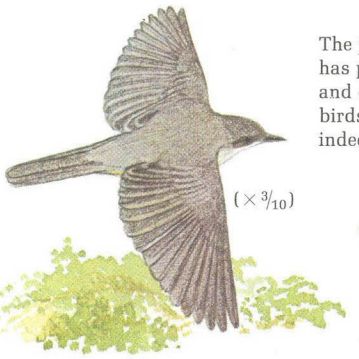


Until recently the Whitethroat was a familiar, numerous occupant of hedges and all forms of scrub (including woodland glades) throughout Europe south of central Scandinavia. The tumbling, parachuting display flight (often from heights of 100 feet) and chattering song made it additionally conspicuous.

In fact, until the autumn of 1969, the Whitethroat population had been steadily increasing. The following spring, only some 20 per cent of the expected number returned to western Europe. Researchers checked every possible cause, including weather on migration, use of anti-locust insecticides in wintering areas and the possibility of epidemic disease. They finally concluded that the extended drought in the Sahel region, south of the Sahara, had left the Whitethroats with insufficient food to "fuel up" for the return journey, so that many had perished attempting to cross the great desert. In most areas numbers are still much reduced.

The nest is built low in cover. Brambles or twigs in a patch of nettles are a favourite site, and first clutches (usually of five) are laid from mid-May on. The female incubates, but both sexes co-operate in feeding the young, betraying anxiety with harsh scolding calls from nearby cover when an observer approaches. Incubation and fledging periods are short (about 11 days), so there is frequently time for a second brood, which is generally smaller than the first.

Lesser Whitethroat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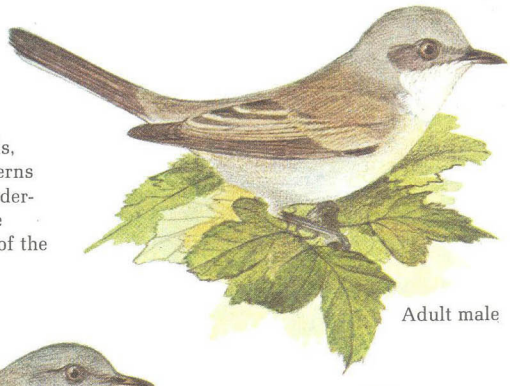
In flight, the Lesser Whitethroat is seen to be a shorter-tailed, smaller bird that the common Whitethroat, but similar in shape

The juvenile Lesser Whitethroat has pure grey head plumage and dark ear coverts. Some birds appear very pale indeed in the field

(×3/5)

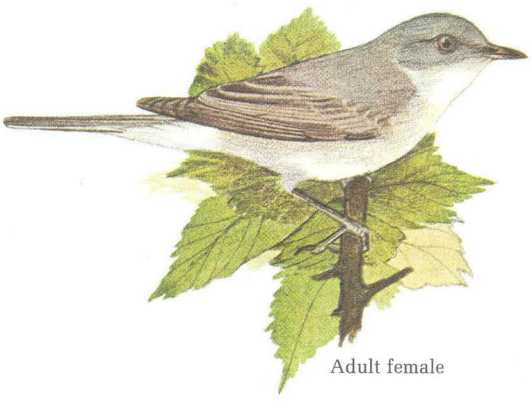
As with the common Whitethroat, there are some white under-tail feathers, just visible in side view

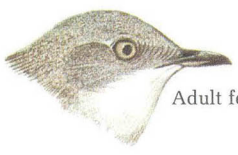
Lesser Whitethroats have a habit of feeding unobtrusively among leaves high in trees, when an observer sees only the pale underparts. They may also take insects on the wing


Adult male

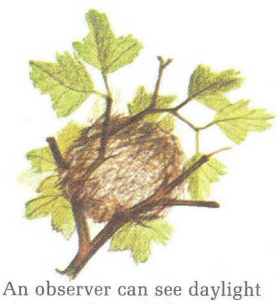
These are diminutive, stern-looking birds, which share many basic behaviour patterns with the common Whitethroat. Their under-plumage is colder-toned and plainer, the upper more uniform; the rufous-brown of the common Whitethroat is lacking

Adult male

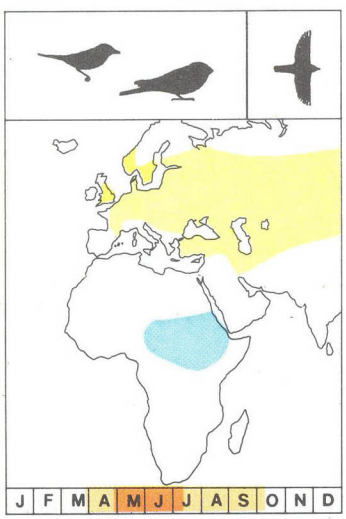

Adult female


Adult female

Juvenile



An observer can see daylight showing through the Lesser Whitethroat's finely built nest of twigs, roots and grasses



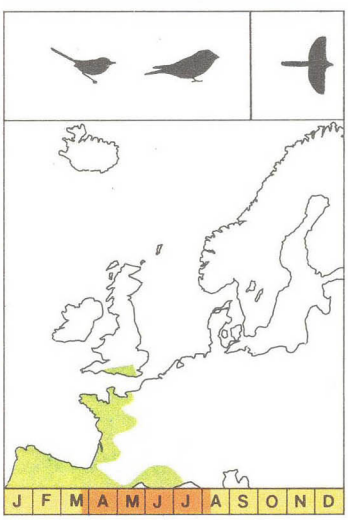
Subtly handsome in grey and white plumage, the dark mask round the Lesser Whitethroat's eyes explains its old name of "mountebank": a quack who donned disguise to sell phoney medicines.

It differs sharply in habitat from the common Whitethroat, needing dense thickets with some tall trees, and unlike the common Whitethroat will occupy overgrown gardens and new forestry plantations. Scrubby woodland edges and deep hedgerows are also much favoured. Territories are large, with tree-top song posts sometimes several hundred yards apart. Males sing particularly actively in early morning sunshine, producing a far-carrying, monotonous rattle much resembling the Cirl Bunting's song.

The frail nest is sometimes used for two broods. Since adults arrive late in spring, and moult before leaving in autumn, incubation and fledging periods are brief, and care of the young is short-lived. Despite this, the parent birds are usually active in defence of the nest. Like many Warblers, the diet changes prior to migration from primarily insects to primarily fruit.

Lesser Whitethroats have an unusual migration pattern. European birds move southeastwards via Italy, Greece and Cyprus rather than south through Iberia like the Common Whitethroat. Thus, on their way to winter in Ethiopia and the Sudan, they run the gauntlet of bird-catchers with lime traps and guns.

Dartford Warbler



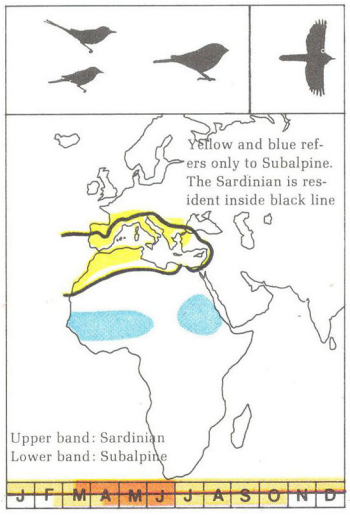
The Dartford Warbler is one of the most characteristic birds of the thorny and impenetrable Mediterranean scrub called *maquis*. Farther north, its chosen habitat may be areas of gorse, lavender or broom, or even tall heather. Urban sprawl has long since banished it from the site of its discovery near Dartford.

Unlike most Warblers, it is to a large extent sedentary, and thus very vulnerable to severe winters. Heavy overnight snowfalls with large moist flakes, rather than persistent frosts, are the deadliest killers. Numbers fluctuate wildly, and the British population has at times been almost wiped out. Down to ten pairs in 1963, it was back to 560 pairs by 1975.

Dartford Warblers are skulking birds, especially on windy days. The bird-watcher's best approach is to wait and watch quietly, but in warm weather, males can be conspicuous, perching high or in dancing song flight. The song is a scratching, metallic warble, while contact and alarm calls are harsh – similar to the Whitethroat's.

The female builds the nest low and deep in cover, and the male assists with incubation. Two, sometimes three, broods are raised per year, and usually four eggs are laid. Small beetles, caterpillars and flies are brought to the young, and blackberries have been noted as an autumn food. How the birds manage in winter when adult insects are in short supply remains a puzzle: spiders and other arthropods may form the greater part of the diet.

Sardinian Warbler—Subalpine Warbler

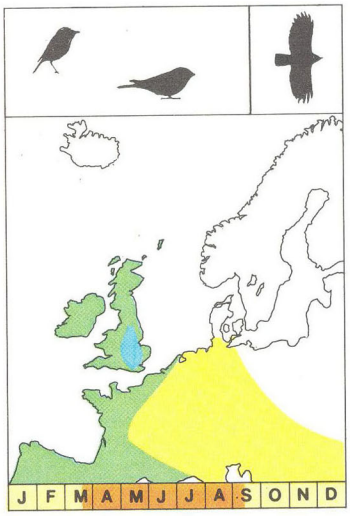


Related species with different lifestyles, the Subalpine Warbler migrates to tropical West Africa, the Sardinian Warbler is more or less sedentary, and suffers population crashes after bad winters.

Subalpine Warblers are birds of sunny hillsides up to 6,000 feet, preferably with ample cover of low, dense scrub, in which the birds lurk, often chattering noisily in alarm, but difficult to glimpse. Best views of them are usually to be had in spring, when the male is in song flight, or when both sexes are feeding young in a nest low in gorse, brambles or myrtle. Two broods are usual, and the drab young may be almost impossible to distinguish from young Whitethroats or, especially, the Spectacled Warbler. Males superficially resemble the Dartford Warbler, but the shorter tail and white moustache immediately set them apart. The song is like the Whitethroat's but more musical.

Sardinian Warblers are alert, active birds, wary and elusive at times, yet they may be seen feeding unconcernedly a few feet from holidaymakers in hotel grounds, or skipping through almond or olive groves round houses and farmsteads. They are found on almost any open land. The scratchy song is uttered in flight or from high perches, and the rattling machine-gun-like alarm call is a characteristic sound of the Mediterranean. Clutches are generally larger than the Dartford Warbler's, and two broods are usual.

Stonechat



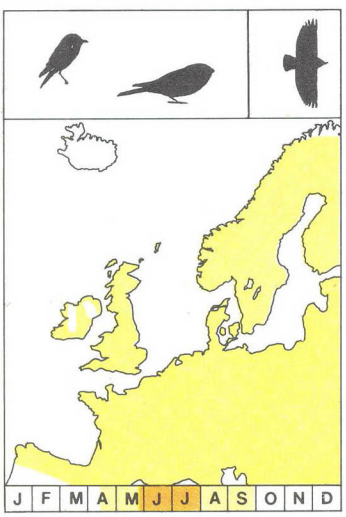
Stonechats, especially family parties, are noisy birds, and their commonest contact call resembles the click of two pebbles being knocked together – hence the name.

The male produces a tuneful jingle of song as he flutters in a bouncy flight up to 100 feet high. Like a Whinchat, the Stonechat inhabits rough, uncultivated open terrain, but favours drier areas with more bushes. A crucial factor may be its need for higher perches than the Whinchat. These include telegraph posts and wires, where they sit alert, wings and tail flicking, scanning the ground beneath for their insect food. Increasing reclamation of large areas of scrubby marginal land for agriculture has resulted in a recent decline of the European populations.

The breeding season is a long one, and an experienced female may produce up to four clutches of five or six eggs in a year, as opposed to a first-year bird, which usually manages only one or two broods. The nest is very deeply hidden, generally in the base of a gorse bush or grass tussock.

Stonechats have an extensive distribution, occurring across Eurasia to Japan, and south through Africa to the Cape. Numerous races have been described, varying in depth of rufous colouring below and extent of black above. Western and southern European birds are usually resident, but those breeding farther north must move south in winter.

Whinchat

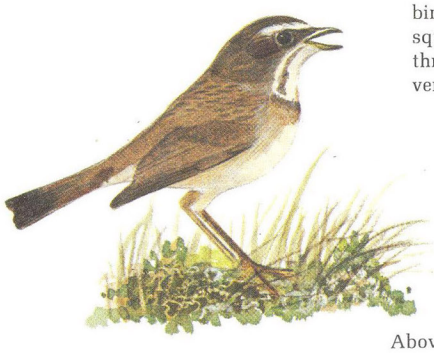


Though similar in many ways to its near relative the Stonechat, this is a more strongly migratory species, which never winters in western Europe. Instead, it migrates to African grasslands as far south as Angola, but is most abundant in the wooded savannah zone extending from Senegal to Uganda. Rough grassland is also its choice of habitat in Europe, where heaths, commons, rough pasture or marshes may be utilized. It shows less preference for gorse than the Stonechat. With the increase in mechanized farming, hedges and rough areas generally are being eliminated, and Whinchat numbers have consequently decreased in many parts.

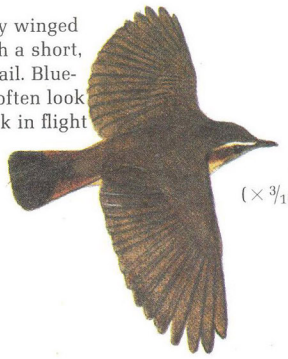
The Whinchat feeds on butterflies, moths and flies, gleaned mainly from grass stalks. Occasionally it catches airborne insects in the manner of a flycatcher. The nest is extremely well concealed in a grass tussock, under dead bracken or where grass grows through the base of a bush; it is sometimes reached by a distinct tunnel pathway, and is built mainly by the female from dry grass on a foundation of coarser grass and moss. It is lined with finer material, but no hair or feathers. The usual clutch contains five or six eggs, incubated by the female for 13 days. Fledging takes the same length of time, the young leaving before they are fully grown. Both sexes feed them and the family party stays together for some time after leaving the nest.

Bluethroat

The streaky plumaged juvenile would be difficult to identify were it not for the tail pattern



A stubby winged bird with a short, square tail. Bluethroats often look very dark in flight



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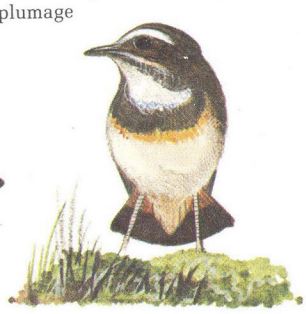
Above and below, left and right: next to its tail, the Bluethroat's eyestripe is its most reliable identifying feature. This remains constant through all the complex variations of plumage



Bluethroats are unobtrusive, skulking birds, best identified by their tails, which repeatedly flick as the birds land or hop about

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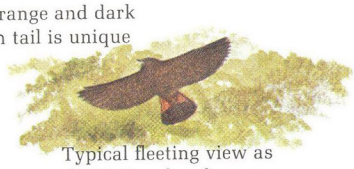
It is possible, but not easy, to see the orange on the tail when it is closed

The orange and dark brown tail is unique

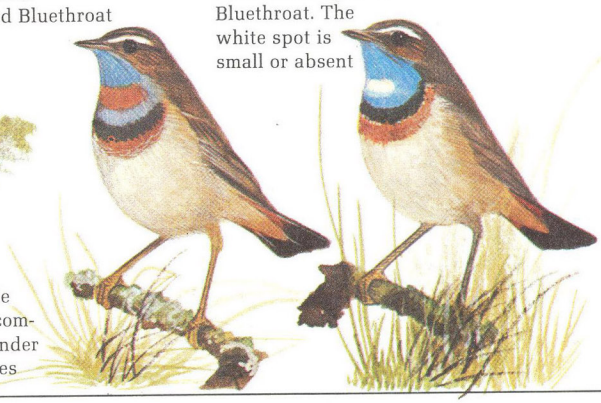


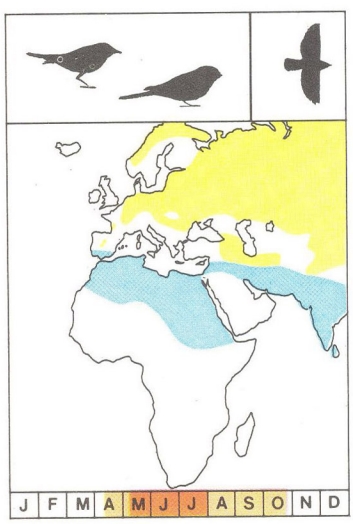
Typical fleeting view as the bird makes for cover

At the seaside Bluethroats commonly feed under Suaeda bushes

Male Red-spotted Bluethroat

Male White-spotted Bluethroat. The white spot is small or absent





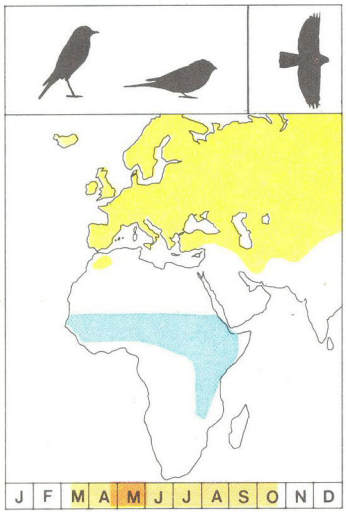
With gleaming sapphire gorget and superb song, the Bluethroat deserves wider acclaim. Its relative neglect by poets and ornithologists alike stems perhaps from its patchy distribution in western Europe. It frequents scrubby or open ground, with some marshy grassland, and this habitat has been much reduced by cultivation and development.

Western European breeders are of the white-spotted form. The Red-spotted Bluethroat breeding in Scandinavia is more numerous, and is one of the common birds of Lapland lakesides and birch scrub. The song is reminiscent of the Nightingale's, a close relative. Though less powerful, it is more varied, and includes frequent mimicry of other birds. It is delivered from a prominent perch or in a song flight. Females generally, and males outside the breeding season, are skulking birds, often only to be seen flitting from one bush into another.

The nest is like a Robin's, built in a depression in the ground, often under a bush. The five to seven eggs vary in colour from blue to olive. Incubation is by the hen, and feeding the young is done by both sexes. White-spotted Bluethroats occasionally rear two broods.

Red-spotted Bluethroats are common passage migrants through Europe, wintering in the Middle East and north-eastern Africa. Their breeding range extends right across Asia.

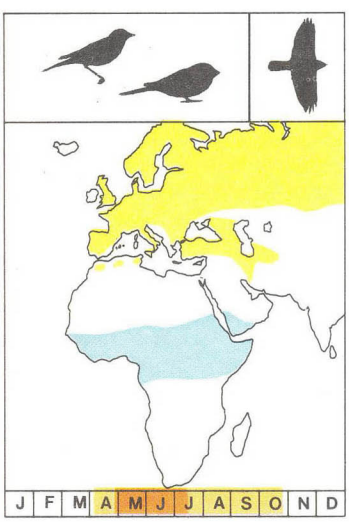
Wheatear



The Wheatear's name derives from Anglo-Saxon words meaning "white rump" – which is a conspicuous feature when the bird flies. This is a widely distributed species, inhabiting barren terrain throughout Eurasia, and also parts of the American Arctic. Mountains, tundra and shingle are all suitable habitats, but unlike several related species, the Common Wheatear is not a desert bird. Crevices among boulders provide nest sites, but oil drums and similar debris are used where available, and the birds sometimes make use of nestboxes. Typical sites have an entrance tunnel up to a yard long. The nest, built by both sexes, is of grass, roots and moss, with a lining of feathers and hair or wool from the rabbits or sheep with which it commonly shares its habitat. Five or six eggs are usual in western Europe, but Arctic breeders may lay up to nine. The female incubates, occasionally aided by the male, and both sexes feed the young. Incubation and fledging periods each last about two weeks, and the young are fully independent by the age of six days. Usually one brood, but sometimes two broods are reared.

Food comprises a variety of ground invertebrates. Berries are taken in autumn when the bird is fattening for migration, which may involve very long flights. Greenland breeders, for example, cover 2,000 miles to northern Spain in a single flight, using up a third of their starting weight.

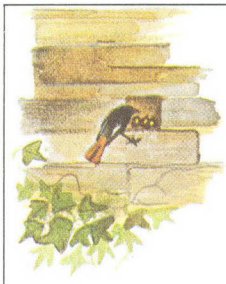
Redstart



This bird's name refers to the vivid russet tail, which contrasts beautifully with the male's elegantly coloured upperparts. He announces his presence in woodlands throughout Europe with a short jingling song. Both sexes have a two-syllabled anxiety note resembling that of the Chaffinch, Nightingale or Willow Warbler – an arrangement which may be of some mutual benefit to all these woodland birds. Redstarts prefer woods with a fairly open canopy and dense undergrowth interspersed with clearings. Deciduous woods are preferred, but pinewoods, parks and gardens may all be used. Males arrive in the breeding areas in April or May, slightly before the females. After pairing, the male chooses the nest site, typically in a hole in a tree, but sometimes in a crevice among stones or under thick vegetation on the ground. The six pale blue eggs are incubated by the female for some 14 days and both sexes feed the young, tending them for two to three more weeks after the two weeks spent in the nest. A second brood may follow. Small insects, such as weevils, moths and flies, form the diet, and the young are fed on caterpillars.

On migration, Redstarts are frequent casualties at North Sea lightships. Numbers fluctuate locally, but a considerable longer-term decrease has occurred in southern England during the present century. In most areas, however, Redstarts remain common.

Black Redstart



Black Redstarts build nest holes in walls or in natural rock faces. The young have bright yellow gapes

(×3/5)

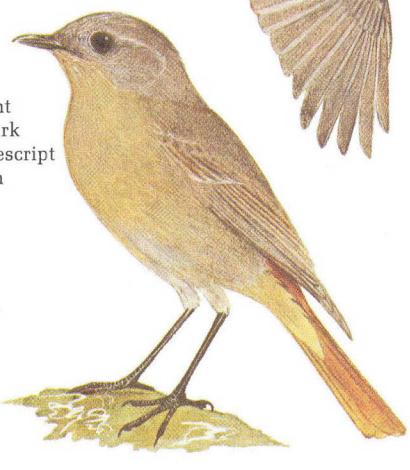
A female in flight. Black Redstarts are larger, broader-winged birds than Common Redstarts and they have less red on their rumps

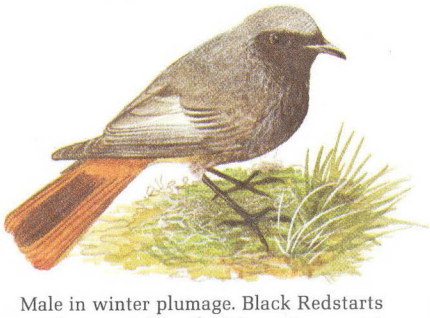
(×3/10)

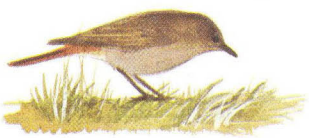
An adult male in summer plumage feeding a young bird. Compared with a young Common Redstart, the young Black Redstart looks sooty and lacks any rufous-brown

Left, the male from behind, orange tail conspicuous. Right, a Black Redstart often hovers to catch insects, rarely perching among branches

Females and juveniles, right and below, have overall dark plumage and appear nondescript until the orange tail is seen

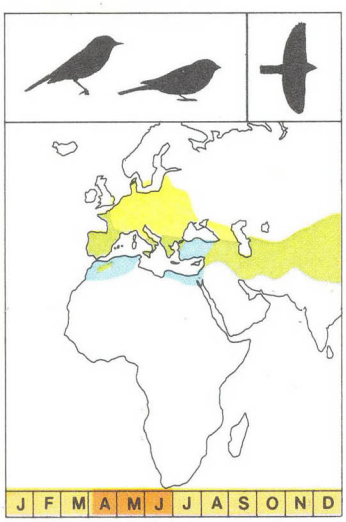






Male in winter plumage. Black Redstarts can be seen taking food from the ground after flying down from a vantage point

Quiet feeders, Black Redstarts can be very unobtrusive



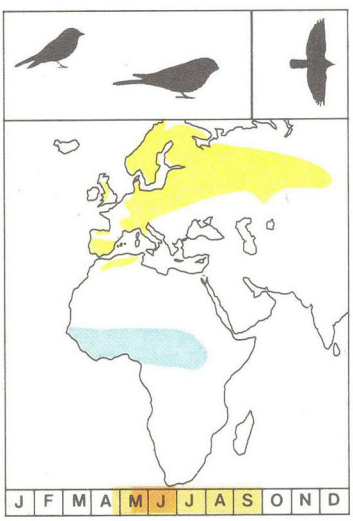
A brief warble, followed by a noise resembling ball bearings rattled together, is a familiar sound in many European towns. This is the song of the Black Redstart. Once a species confined to mountainous areas, it has adapted to the industrial landscape, and is now one of the continent's most common urban birds. It shows special partiality for such places as docks, gas-works, railway sheds and power stations, and its spread in some areas was considerably helped by the devastation left by the Second World War – bombed sites have many features in common with the species' ancestral habitat. Farm buildings are also utilized.

The nest is usually placed on a ledge inside or outside a building; in natural habitats, a crevice among rocks is used. It is a bulky and rather untidy structure of grass and similar materials, lined with hair and feathers. Four or five white eggs are laid, and incubated by the hen. Both sexes feed the young during the rather long fledging period of 16 to 21 days. Polygamy has been recorded. There are two or three broods each year.

A variety of insect food is taken, including small beetles and flies. Midges from polluted water have been noted as a major food at one industrial site in Britain. Berries are eaten in autumn.

The migration pattern varies, and some populations are only partly migratory – Polish and German birds, for instance, have been recovered in Cyprus.

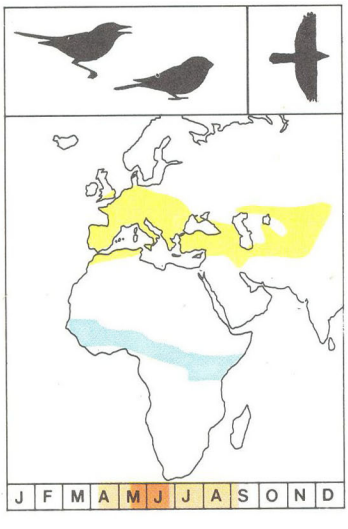
Pied Flycatcher



Despite its name, the Pied Flycatcher feeds to a large extent on insects gleaned from foliage, and caterpillars are a major food source. It is primarily a bird of broad-leaved woodland, but can adapt to conifer plantations if provided with nestboxes. The natural nest site is a woodpecker hole in a tree, and inside this is built a nest made of bark, especially honeysuckle bark where available, and lined with fine grass. Six or seven, sometimes more, pale blue eggs are laid, early clutches averaging larger than late ones. The female incubates alone, fed frequently by the male. The eggs hatch in 12 days, and both parents feed the young during the 15-day fledging period. After they leave, in late June or early July, adults and young virtually disappear for a month or so prior to migration. During this time they moult into new plumage, and probably spend their time feeding quietly in the woodland canopy. The winter quarters are in tropical Africa, but before crossing the Sahara they spend time building up fuel reserves in Iberia: all Pied Flycatchers, even from the central USSR, converge here.

The Pied Flycatcher's European populations have undoubtedly been adversely affected by forest clearance, and it is very patchily distributed in Britain, France, Belgium and the Netherlands. Lack of nest sites is the principal problem, and provision of nestboxes can do much to encourage its spread.

Nightingale

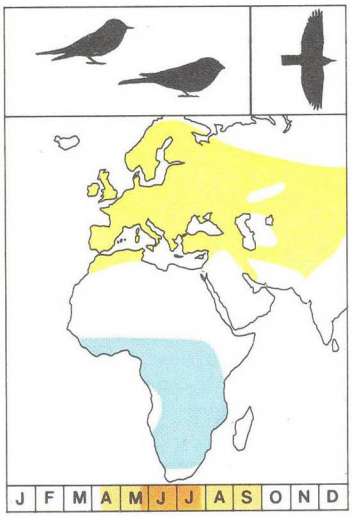


The Nightingale's song has been so praised in literature that comparing it unfavourably with other birds has almost become fashionable. Tastes may vary of course, but for richness, power and variety its song is hard to beat. Nightingales regularly sing at night, and are even heard in their winter quarters of African savannah scrub.

Nightingales arrive late in spring, and take up territories in thickets on the edges of woods—southern edges are often preferred. Shady, dense bushes and an undergrowth of nettles are characteristic habitats. The male has several song posts, some exposed, but most deep in a thicket, one of which may be near the nest. This is a bulky structure, much like a Robin's, with a similar foundation of dead leaves, sited in a depression amongst nettles, or just off the ground in a tangle of vegetation. The four or five eggs are deep olive-brown in colour, and are incubated by the female, who may feign injury when disturbed. The young are fed by both parents and leave the nest after only 11 or 12 days. A single brood is raised. Observers passing near by may hear the guttural, churring warning call, or a two-syllabled alarm resembling the Redstart's or Willow Warbler's.

In many parts of Europe, Nightingale populations have been decreasing. Changing forestry methods are largely to blame: growing coppice trees for poles, for instance, is dying out, thus eliminating a favoured habitat.

Spotted Flycatcher



The skilled aerobatics of the Spotted Flycatcher as it sallies out to capture passing insects are an entertaining spectacle in gardens and parks over the whole continent of Europe. Originally a bird of woodland glades, it now exploits the man-made environment, though still preferring places with some tall trees. The feeding tactics of the Spotted Flycatcher can work only when flying insects are really abundant, and this state of affairs does not exist much before June. Summer migrants, which arrive in April and May, eat larval insects, or, like swallows and martins, fly unceasingly in pursuit of the few that are airborne. Because of its feeding habits, the Spotted Flycatcher is the last summer visitor to return, and its breeding season is very late: most birds do not lay until well into June. The natural nest site is a ledge on a tree against the main trunk, but buildings provide many excellent substitutes. Open-fronted nestboxes are popular, and disused blackbirds' nests on buildings are often occupied. The same site may be used in several successive years and the nest itself is a neat, compact structure of twigs, grass and moss, bound by cobwebs, and lined with finer vegetation and feathers.

Early clutches number four or five eggs; later ones contain fewer; and the second broods, which some pairs produce during July, may be only two or three strong. Both sexes incubate and feed the young.

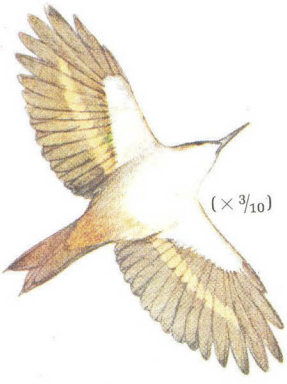
Treecreeper

A slender beak for extracting insects

The unusually stiff, pointed tail feathers sit firmly against the bark, providing support

The Treecreeper's nest is built in a tree cavity, a hollow stump, or sometimes behind a loose piece of bark

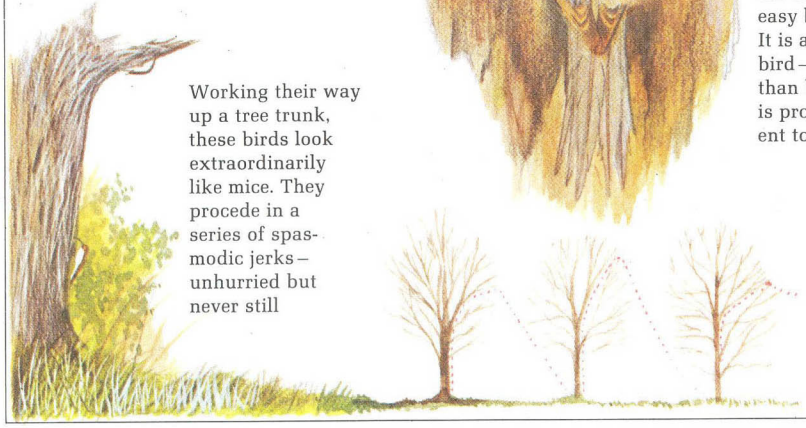
A male approaching the nest – upper wing pattern and curved beak evident. Although the beak is shorter on young birds, they cannot be confused with other species



A leisurely, undulating flight, but the observer is unlikely to catch a glimpse of the underwing feathers

The extremely thick and fluffy feathers on the lower back and flanks can be puffed out round wings and body, disguising its profile and reducing heat loss. Tiny size, mousy colouring and mousy behaviour make the Treecreeper an easy bird to identify. It is a confiding bird – though rather than being tame it is probably indifferent to human beings

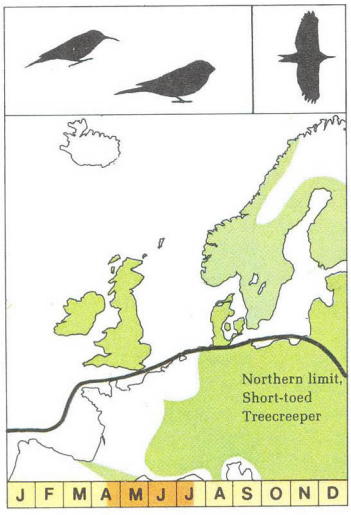
Treecreepers roost in crevices in bark, and Wellingtonia trees are particularly favoured for this purpose because their bark is so easily excavated



Working their way up a tree trunk, these birds look extraordinarily like mice. They procede in a series of spasmodic jerks – unhurried but never still

Standard Treecreeper feeding route

With its white underparts, a Treecreeper stands out best against a dark-coloured tree trunk

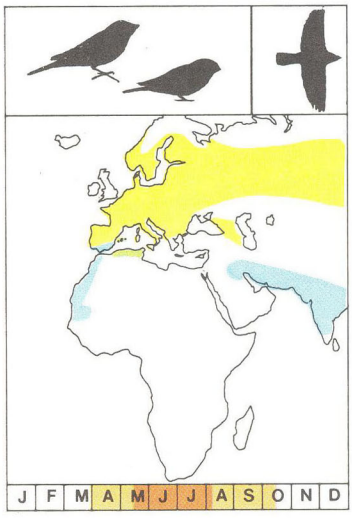


Treecreepers seem almost to be part of the trunks and boughs on which they forage like animated pieces of bark. They inhabit almost any woodland or well-wooded parks and gardens, provided there is some old timber with loose bark for nest sites. Where their range overlaps with that of the very similar Short-toed Treecreeper, the common species seems to prefer conifers, while the Short-toed occurs in broad-leaved woods. Elsewhere, notably in Britain, the Treecreeper is more common in broad-leaved woods.

The nest is usually placed behind loose bark or ivy, sometimes in a crack in a shed adjacent to woodland. A bulky foundation of twigs is wedged into position, on which is built the cup of grass and bark strips lined with feathers and hair. This is constructed by both sexes, but incubation of the five or six eggs is mainly the female's task. Both sexes feed the young, and the fledging period is 14 or 15 days – the same as the incubation period. Second broods are unusual, but when they do occur they are often raised in the same nest.

Treecreepers are vulnerable to severe winters, but in their roosting behaviour at least show a valuable adaptation for surviving cold nights, choosing sheltered crevices behind bark or even excavating hollows in the soft, fibrous bark of Wellingtonia trees. This is a sedentary species, rarely travelling more than a few miles.

Wryneck



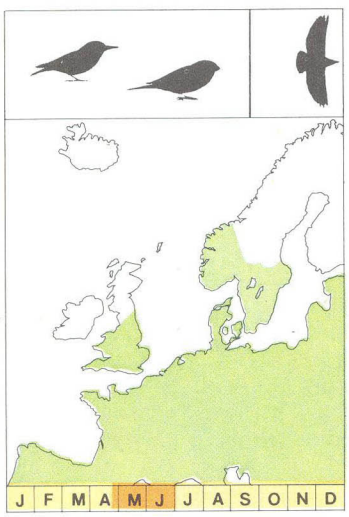
Camouflaged plumage gives the Wryneck a moth-like beauty when seen at close quarters, and its habits are of great interest. It is a matter for concern that its populations are decreasing throughout western Europe, and that it is almost extinct as a breeding bird in Britain. The causes of this decline are unknown, but may be climatic.

The Wryneck is classified as a member of the woodpecker family, but lacks many of their climbing and pecking adaptations. However, it does share with them the feature of an exceedingly long protrusible tongue. This is not barbed or spiny like a woodpecker tongue, but traps prey by means of a sticky coating ideal for gathering ants, which are a favourite food.

The bird derives its name from the extraordinary twisting postures of the neck during courtship and threat display. This latter is demonstrated in spectacular fashion when an incubating bird is disturbed: the neck writhes, the tongue flickers in and out, and fierce hissing noises complete a lifelike imitation of a snake.

Nests are located in natural holes in trees: unlike woodpeckers, Wrynecks cannot excavate holes. Old orchard trees are much favoured. The usual clutch contains seven to ten eggs and Wrynecks have the uncommon ability to lay more than one egg a day. The female incubates, aided occasionally by the male, and the eggs hatch in 12 to 13 days.

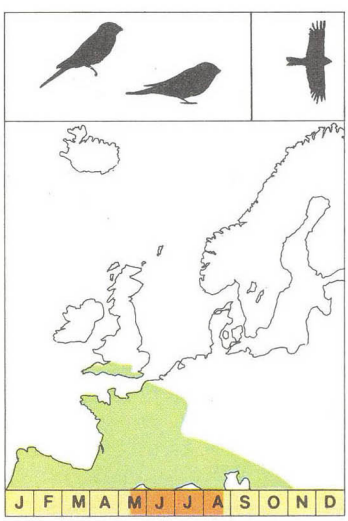
Nuthatch



Nuthatches give out a loud, cheery contact whistle, which is a familiar sound in woods and parks–but few people connect it with the small bird high up on a bough. The song, a repeated whistle, has the same ringing quality and may be the prelude to a display flight in which the male floats downwards towards the female with wings and tail spread.

A Nuthatch's presence may be revealed by the loud tapping noises made as the bird hammers nuts. For this operation, the nut is jammed firmly into a crevice of a tree which will also be used as a store place. Nuthatches which acquire the bird-table habit may come and go at an astonishing rate, since many of the peanuts or sunflower seeds they take are simply hoarded. The mud smeared around the nest hole probably serves to reduce competition with other hole-nesting birds, but is also used inside the cavity to fill cracks and irregularities. Although Nuthatches quite often use nestboxes, they may be impossible to inspect, with the lid firmly plastered down from inside. The nest is a rather feeble collection of dead leaves and scraps of bark which conceal the eggs when the female is off the nest. There are six to nine eggs, which hatch after 14 to 15 days. The fledging period is 23 to 25 days–very long for so small a bird, though hole nesters generally have long fledging periods. Nuthatches rarely wander far from their area of origin.

Cirl Bunting

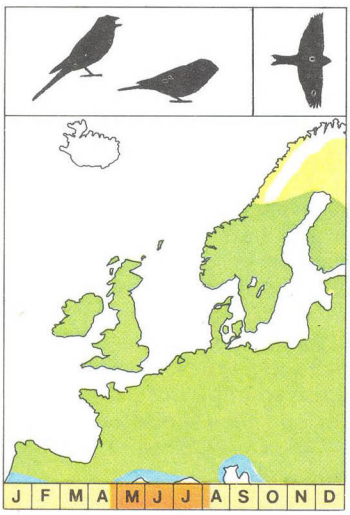


Male Cirl Buntings in breeding plumage are handsome birds, but the dull-plumaged females and juveniles are easily confused with other buntings. This is an unobtrusive species, easily overlooked. The best time to locate the birds is in spring, when the male is delivering his monotonous song from an exposed perch. This is simply a repetition of a single sharp note, and somewhat resembles the rattle of the Lesser Whitethroat.

Its most favoured habitat is more sheltered than many buntings prefer – parkland or woodland edges near cultivation. The nest is built by the female and is generally placed in the base of a bramble or other bush, or in a depression on the ground. The three or four eggs are incubated by the female for 11 to 13 days, and she is fed on the nest by the male. After the young hatch, the male visits the brood with the female, normally giving his food to her for distribution. The fledging period is also 11 to 13 days. Two or three broods are commonly raised. Like several other buntings, Cirl Buntings disturbed at the nest may perform an "injury-feigning" display.

Family parties often remain together throughout the winter, feeding on stubble or in gardens, quite often visiting bird tables. The Cirl Bunting is largely resident, and having spread northwards during the nineteenth century, when it colonized Britain, now appears to be declining.

Yellowhammer

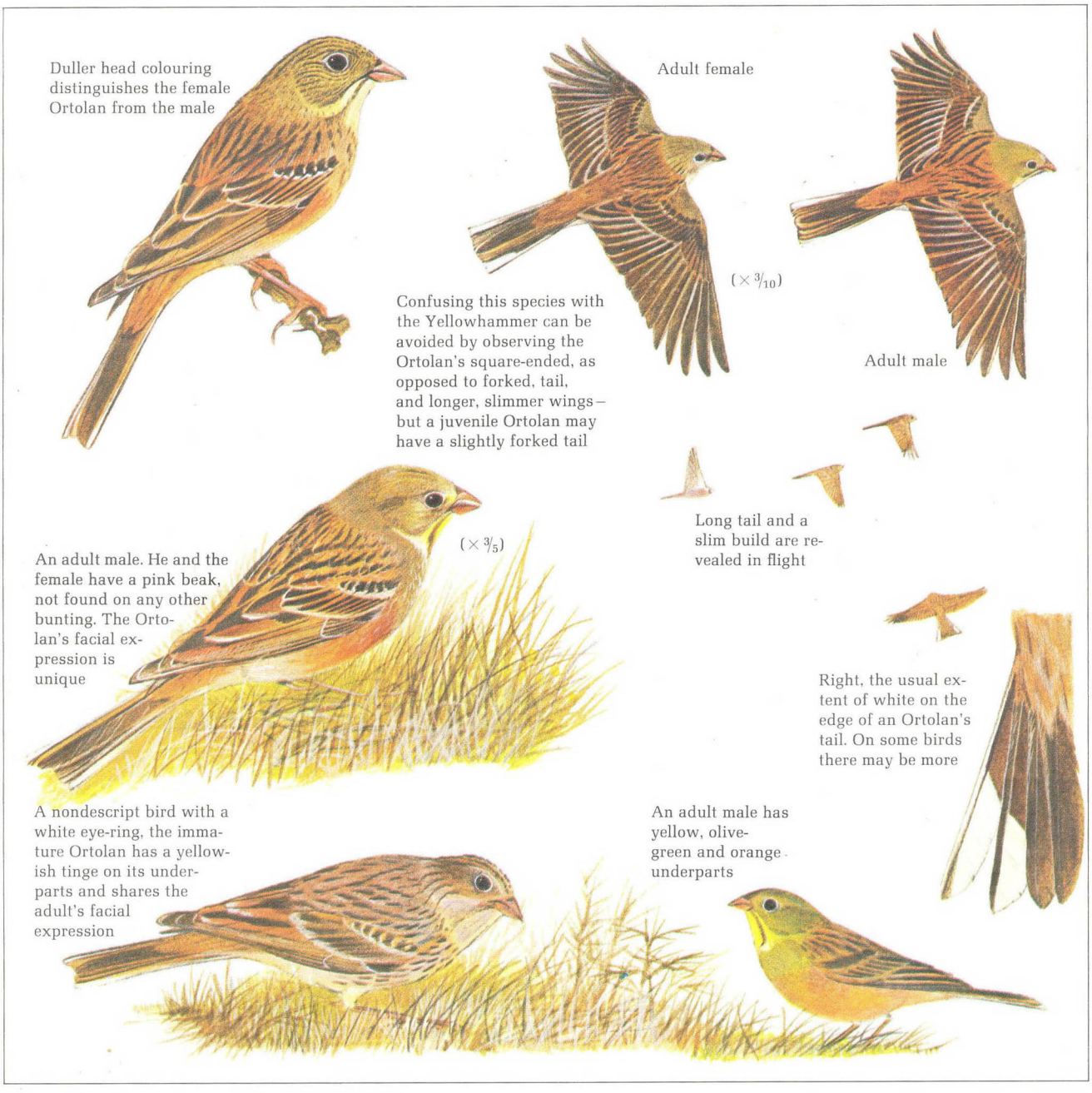


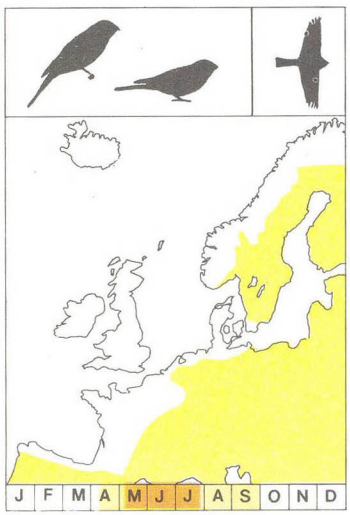
Yellowhammers have a monotonous song, often written as "little bit of bread and no cheese", which is one of the most familiar sounds of summer in most parts of Europe except the Mediterranean seaboard.

This is a bird with a wide habitat tolerance: almost any area will suffice that provides some open ground with rough vegetation and a few trees and bushes. Young conifer plantations in which there is still a dense ground cover of brambles support the highest density of Yellowhammers – up to 200 pairs per square mile in parts of Britain. The nest is built low down, often on the ground or in the bank of a ditch, or in a low bramble just off the ground. It is a rather bulky grass structure, lined with fine roots. Three or four eggs are the usual clutch, incubated by the female with occasional help from the male. Incubation and fledging periods each last 12 to 14 days. Both parents feed the young and, like many seed-eating birds, rear them on a diet of invertebrates, especially caterpillars and other insect larvae, but also occasional slugs and earthworms. Two or three broods may be reared, and it is scarcely possible to walk across a heathland in summer without hearing the anxiety call of a Yellowhammer with young near by.

Moult takes place in early autumn, and from then on, Yellowhammers associate in flocks feeding on stubble and roosting in vegetation or reeds.

Ortolan Bunting



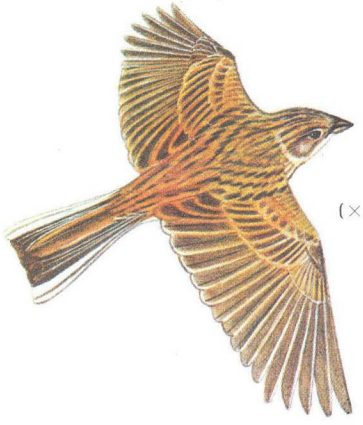


Ortolan Buntings are widely, though rather patchily, distributed throughout Europe, with the exception of north-west France and Britain. Their habitat requirements are simple – some bushes or other cover, and some open ground for feeding. These may be found on the treeless upper slopes of mountains in the Mediterranean countries, or on agricultural and scrub land farther north. Food consists of grain and other seeds, as well as insects, which form the main diet of the young. The insects taken include some fairly large species – beetles, crickets, and, in the winter quarters, locusts.

Males sing from bush tops or telegraph wires, the sound produced being a pleasant if somewhat monotonous series of six or seven notes, of which usually two are lower-pitched than the rest.

The nest is placed in a hollow in the ground, well concealed by overhanging vegetation or sometimes a rock. It is built by the female of dry grasses, roots and leaves, with a lining of finer vegetation and hair. Four to six eggs are laid, varying in colour, though always with some of the streaked markings characteristic of buntings. Incubation, mainly by the female, lasts 12 to 13 days, and she also takes the main share in feeding the young. These often leave the nest to fend for themselves before fledging, like various other ground nesters, sometimes as early as nine days after hatching.

Rock Bunting



On a young bird the inner secondary feathers, the upper tail coverts and the centre of the tail itself are a distinct rufous-brown

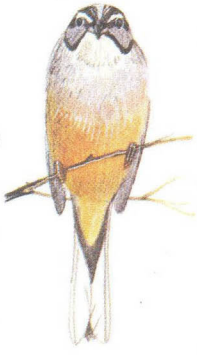
(× 3/10)

In flight, the Rock Bunting is seen to have a long tail and fairly broad wings. There is a faint double wing bar and very conspicuous white outer tail feathers. A rufous-brown rump identifies the bird as an adult

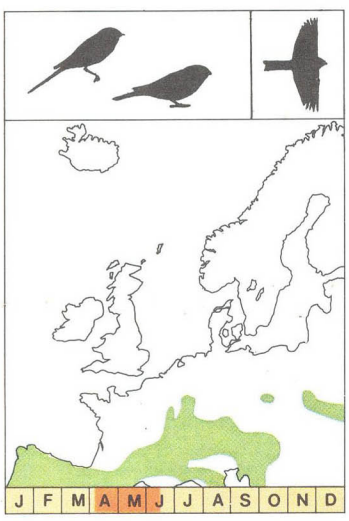
(× 3/5)

Grey head, prominent eyestripe and black head patterning make this species instantly recognizable and unlike any other European bunting. The female bird is always slightly duller than the male, but both sexes vary in brightness depending on how recently the moult has taken place. The upper beak is dark, the lower is light in colour

The juvenile bird is not easy to recognize, but at close quarters its basic shape, beak and tail pattern will distinguish it from other buntings



Apart from the almost sinister head pattern, a front view of the Rock Bunting reveals underparts of a warm orange-brown colour and very large white outer tail feathers

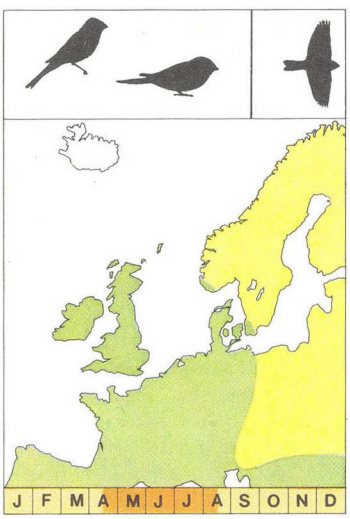


Boulder-strewn mountain slopes are the characteristic breeding habitat of this species, but rocks are not essential: alpine meadows and even vineyards may be chosen. The male advertises his territory with a song that somewhat resembles the Yellowhammer's, but is much higher pitched, with the final note often repeated several times; its general effect somewhat recalls the Serin.

The nest, built by the female, is of the normal bunting pattern, largely made of grass, with perhaps a few bits of moss and bark, and lined with hair and fine plant material. Though normally sited in a hollow amongst rocks or on the ground, it is also frequently placed in a bush or small tree, sometimes six feet or more off the ground. The eggs, four to six in number, are remarkable for their markings – a rainbow network of fine lines, an extreme example of a characteristic shown by all bunting eggs. Incubation, by the female alone, is for 13 to 14 days, and the young are fed by both parents. The fledging period is uncertain. There is only one brood, and after the breeding season the birds move to lower terrain for the winter.

Northern breeders migrate south, some reaching the southern limit of the breeding range in North Africa. Here, Rock Buntings may be seen in quite large flocks with other buntings. The flight call is a rather liquid twitter, and a sharp note resembling the Cirl Bunting's is also used.

Reed Bunting

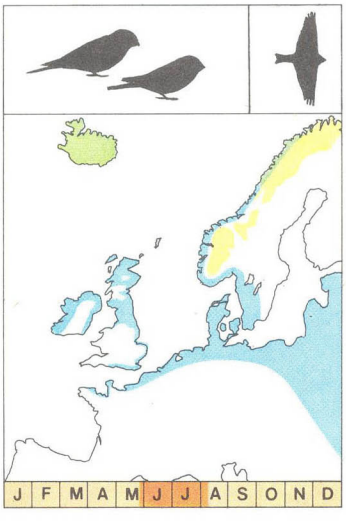


Many birds suffer from human activities—but a few show sufficient adaptability to profit from change and the Reed Bunting is one of these. Its typical habitat is wetland—marshy scrub with tussocks of rushes and sedge. Such habitats are gradually being eliminated throughout Europe, and many species which depend on them have declined drastically. The Reed Bunting has reacted by exploring drier habitats, and has successfully settled in such unpromising territory as barley fields. In the process, it has probably adversely affected other buntings, particularly the Yellowhammer.

Wherever it occurs during the breeding season, the Reed Bunting can quickly be located by its song—a simple and, to some, irritatingly monotonous repetition of three notes followed by a nasal whistle. This final note closely resembles the alarm call, which is readily delivered when an observer enters the territory.

Reed Bunting nests, made of grass, are placed low down in a sedge, rush or grass tussock. They usually contain five highly distinctive eggs, which are brown with heavy black spots and scrawls. When disturbed, the parent (male or female) often reacts by feigning injury. The eggs hatch after 13 to 14 days, and a further ten to 13 days completes the nest development of the fledglings, which are fed by both parents. Two broods are usual, but there are occasionally three.

Snow Bunting



A flock of Snow Buntings provides some of the most charming sights and sounds of winter on the coasts of western Europe. Feeding flocks frequently rise and fly around uttering melodious trilling calls, and resembling drifting snowflakes. The species is mainly Arctic–its only breeding outpost in western Europe is in the mountains of Scotland. It feeds mainly on seeds, gleaning them efficiently even from the surface of snow.

Males are first to return to the breeding areas, as early as March, even in Greenland. They immediately claim territories in the snowbound landscape, proclaiming them with a melodious song and defending them assiduously against neighbours. However, a new fall of snow brings a temporary cessation of hostilities, and the birds form flocks until conditions improve. Females arrive about a month later and are at first greeted with hostility by the males. When this provokes no reaction, the males' behaviour switches to courtship displays and chases.

The nest is bulky, built in a rock crevice, or occasionally, where available, in a building. It is constructed in three layers: moss outside, then grass and finally a lining of feathers. Four to seven eggs are laid and incubated by the female for 12 to 13 days. Both parents feed the young, which fledge in ten to 12 days. During the moult in early autumn, the birds are temporarily flightless.

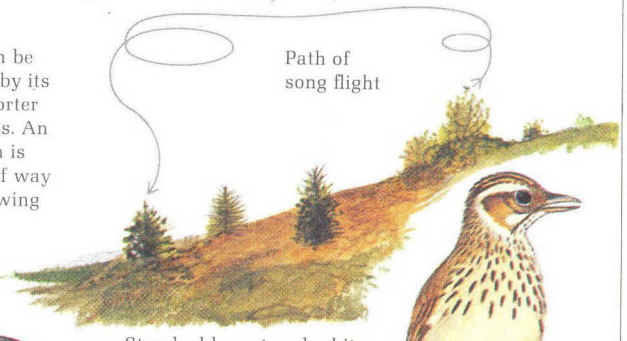
Woodlark

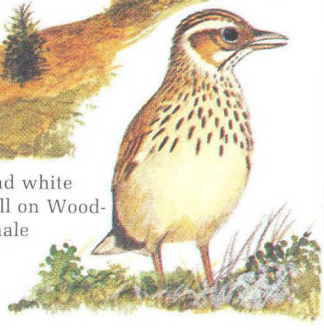
(× 3/10)

Typical flight attitudes

When it is flying, this bird can be distinguished from a Skylark by its slightly smaller size, much shorter tail and jerky flight movements. An additional point of recognition is the black-and-white patch half way along the leading edge of the wing

Path of song flight





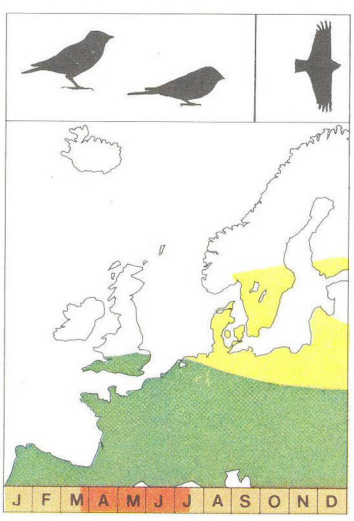
Streaked breast and white eyestripe show well on Woodlarks of all ages, male or female

An adult in fresh plumage – larks' feathers wear very easily, resulting in a paler overall appearance. The black-and-white patches on the mid-leading edges are visible on folded wings. It is a stubbily built bird

(× 3/5)

A young bird, which has left the nest, calls to a parent. At this early stage the wing feathers are very short. Young birds can run when they are only ten to 12 days old

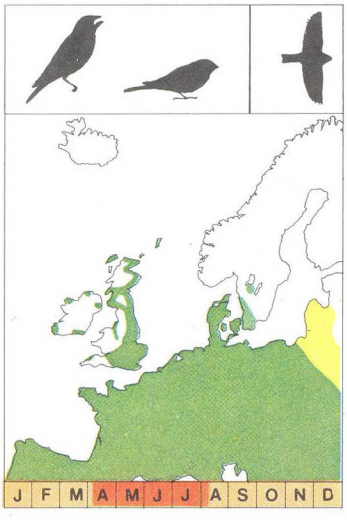
The Woodlark's crest is fairly prominent. Rear view shows a tail strikingly shorter than the Skylark's, with white outer tips rather than white outer edges



The Woodlark's song is less sustained than the Skylark's, but hauntingly beautiful. It is delivered from a circling song flight in short bursts, which include sad, liquid, descending phrases. Nowhere as abundant as the Skylark, this species prefers heaths and open areas with a mixture of short turf and longer vegetation and a few scattered trees – which may be used as perches and, occasionally, as song posts. Except in the northern part of their range, Woodlarks are extremely sedentary birds, spending most of the year in pairs or family parties in or near their territories.

Nesting commences as early as March – sometimes even during late snows. The nest is built in a depression on the ground, the outer layer being constructed mainly by the male from coarse grass, the female adding a lining of fine grass and hair. Three to four brown freckled eggs are laid, which the female incubates in spells of about 45 minutes, interrupted by feeding intervals of about eight minutes. Her immediate departure from, and return to, the nest is on foot, but she flies, accompanied by the male, to the feeding area, which may be over half a mile from the nest. Incubation lasts about 14 days, during which the male sings very little. The young are fed by both adults, and fledge in 11 to 13 days. However, they often leave the nest before this, and hide in hollows in the ground, between which pathways become established.

Corn Bunting



Though one of the most drab plumaged of European birds, the Corn Bunting is an interesting species whose distribution and habits show puzzling features. It inhabits wide, cultivated fields, especially of cereals, preferring those without hedges. Hence, modern trends in agriculture are to its advantage. However, it is patchy and local in distribution, and during the course of this century has almost disappeared from Ireland, where it was once common.

Its breeding behaviour is also surprising. Unlike other buntings and seed-eating birds, the male takes little part in nesting. He may accompany the female while she builds, but incubation and feeding the young are her tasks alone. It was until recently thought that the male Corn Bunting was polygamous, but it now appears that this is by no means always so. The male has several song posts, often up to 150 yards from any nest, and his distinctive song resembles the jangling of a bunch of keys. During the breeding season his flight appears clumsy, with legs dangling – a habit which probably derives from the display flight he sometimes performs.

Every one and a half to two hours, the female leaves the nest to feed up to 400 yards away, where she is often then joined by the male. The nest is hidden on the ground, in a cornfield or on marginal land. The clutch contains three to five eggs, and up to three broods may be raised each year.

Crested Lark

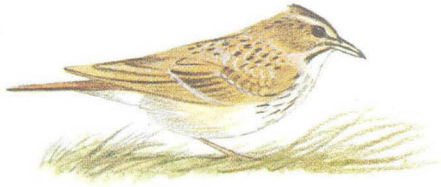
Wing action is mainly from the horizontal downwards

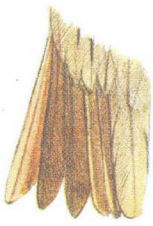
This species can quite often be seen perching on low trees or bushes

From beneath, the Crested Lark shows a pinkish-orange underwing, which contrasts with the plain brown of the Skylark's. The outer tail feathers are bright orange

(× 3/10)

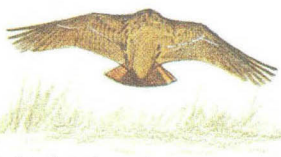
In flight, the Crested Lark shows a broad-winged, short-tailed profile. Its dumpy shape belies a remarkably buoyant flight





Portion of a juvenile's tail, showing the lesser extent of orange on the young bird

The rotund appearance of a bird with its feathers fluffed out in cold weather. By contrast, the hot climate makes Spanish Crested Larks appear slimmer than the norm

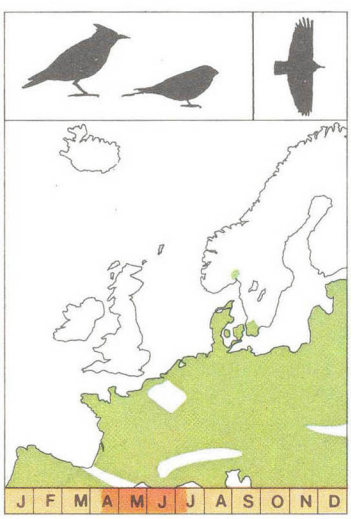


Larger than on any other European lark, the crest will frequently be seen raised. This species has a larger beak than the Skylark. There is a dark patch at the top side of the breast

(× 3/5)

From behind, a clear view of the orange, as opposed to white, outer tail, which unfailingly distinguishes this species from the Skylark

Song perches are generally high

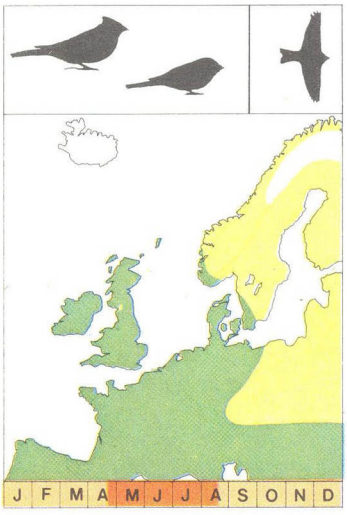


As pleasing as it is distinctive, the Crested Lark's call is a liquid whistle of four syllables which rises in the middle of the phrase. The bird's song, with its especially clear tone, rivals the Skylark's, but is usually briefer, delivered from the ground or a perch on a building. There is also a display flight, but unlike the Skylark, the Crested Lark rises and descends in silence, uttering its song in flight or from a perch only after it has climbed to about 200 feet.

Crested Larks frequent even more arid and sparsely vegetated terrain than Skylarks, and hence occur in such man-made habitats as roads, railway sidings and even bomb-sites. They nest in depressions in the ground, usually in the shelter of a shrub or grass tussock. Four eggs form the normal clutch, and the female incubates alone for 11 to 12 days. The young are fed by both parents on insects, although the normal diet of adult Crested Larks is grain and grass seeds. Like other larks, they leave the nest early, sometimes as soon as eight days, and a good week before they can fly. Two or three broods are raised.

Like many other larks, this species shows great variation in size and colour throughout its extensive range; colour differences are correlated with humidity and with the soil colour of its habitat. Fortunately, the four European races of this largely sedentary species are all very similar to each other.

Skylark

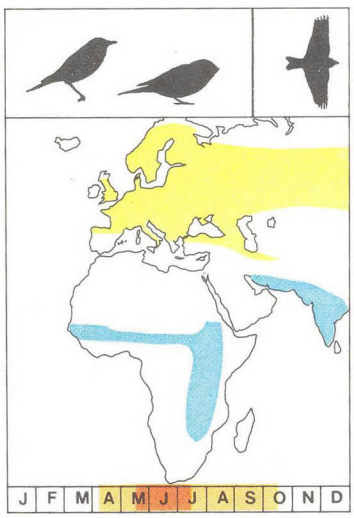


Although its remarkable song has earned the Skylark a place in literature, fame has not saved it from persecution. During the last century, Skylarks were netted in thousands daily in Britain, and they are still killed on a large scale for the table in Belgium, France and Mediterranean countries. The song is notable not only for quality and variety – including trills, warbles and mimetic passages – but also for duration. Individual song flights last several minutes and the song period covers more than half the year. As well as in flight, the song is sometimes delivered from a fence post or the ground.

Skylarks are birds of open fields and feed entirely on the ground, taking both plant items and small invertebrates. Snow cover may force large-scale movements, and severe winters can markedly reduce populations. Scandinavian populations are strongly migratory, moving to France and Spain in winter. Southern populations are rather more sedentary.

The nest is a hollow on the ground. It is sheltered by vegetation – usually grass – but crops such as sugar beet are also employed. The female usually lays three or four eggs. Incubation, by the female alone, lasts only 11 days, and the young leave extremely early – from nine days onwards. They may return to the nest at night, but do not fledge for 20 days. During this dangerous time their scaly plumage provides excellent camouflage, and the adults are wary, only approaching the nest on foot.

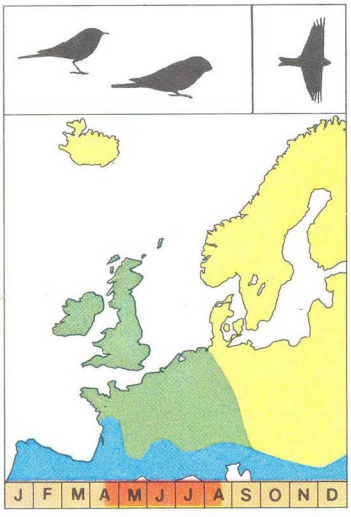
Tree Pipit



Less numerous and less widely distributed than the Meadow Pipit, the Tree Pipit has a more restricted choice of habitat – usually heaths with rough vegetation and scattered trees, clearings in woods, woodland edges and in high birch or oak trees in the depths of mixed deciduous woods. It has turned present-day forestry methods to advantage, for conifer plantations in their early stages provide an ideal habitat. Males arrive in late April, and quickly take up territories; females appear soon after. The female builds the nest, attended by the male. It is a simple grass cup, placed in a depression and usually well concealed under vegetation. During the four or five days before the clutch is complete and incubation can commence, both adults feed close to the nest and the male does little singing. Once incubation of the four to six eggs has started, he commences his song flights, often far away from the nest. After the eggs have hatched, 13 or 14 days later, his singing is again curtailed as he aids the female in feeding the young, which fledge after 12 or 13 days.

The adults moult wing and tail feathers before their autumn departure, which is mainly in September. The birds occur at all times, singly or in small parties, though roosts of larger numbers have been encountered. The food consists of live ground insects – beetles, grasshoppers, leatherjackets and spiders – and, occasionally, seeds.

Meadow Pipit



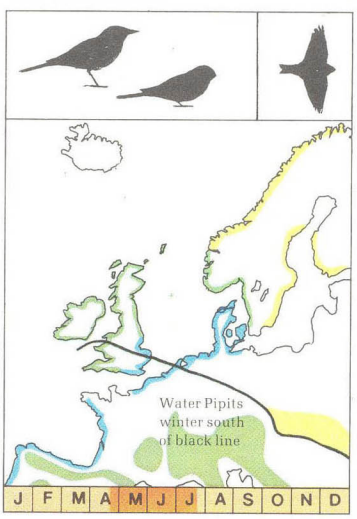
On the bleakest, mistiest moorland, sometimes the only sign of birdlife for long periods of time is the sibilant call of the Meadow Pipit. Almost ubiquitous in such surroundings, the bird also thrives on downs, fresh marshes, sand dunes, and even on railway or motorway cuttings.

Breeding commences early, and the simple grass nest is sited in a depression in the ground under over-hanging vegetation, often in a cavity in the wall of a gulley. Analysis of British nest records shows that clutch size averages about four and a half at sea level, decreasing to four above 1,000 feet. Birds in northern parts of the range lay larger clutches. The female incubates for 13 days, and both parents feed the young during the fledging period of 12 days. Two broods are usual.

Only 54 per cent of Meadow Pipit eggs actually survive to hatch, and of those which do, only 30 per cent result in fledged young—figures probably typical of many small birds. Life expectancy at fledging is only ten months, but a bird surviving its first year can expect a further 15 months of life. In many areas, the Meadow Pipit is the most frequent victim of the cuckoo.

Meadow Pipits feed on ground invertebrates and in moorland areas crane flies and their larvae are an important part of the diet. In the southern part of its range, the species is only a partial migrant, wintering in Mediterranean areas and North Africa.

Rock Pipit—Water Pipit

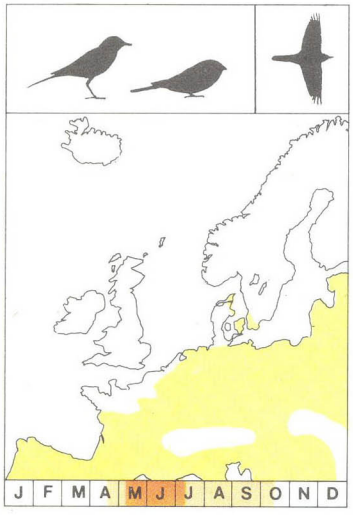


Rock and Water Pipits are actually members of the same species, of which the various races fall into two fairly distinct groups. Those called the Rock Pipits nest and forage along coastlines, while the Water Pipit group inhabits mountainous places.

The feeding habits of Rock Pipits have been closely studied in south-west England. They consume slightly more than their own weight of food each day, made up from enormous numbers of small periwinkles and the larvae of midges or flies gleaned from rotting seaweed. During the breeding season they forage mainly on grassy areas slightly inland. Members of the Water Pipit group feed on insects and spiders and some small snails. All members of the species build a simple grassy nest, the Rock Pipits in a rocky crevice, the Water Pipits in a grassy bank. The clutch of four or five eggs is incubated by the female for 14 days. The young remain in the nest for the rather long period of 16 days.

Communal roosting in rock crevices takes place around the end of the breeding season. In winter quarters, the birds are encountered occasionally, but regularly in ones or twos. In Britain, a few Rock Pipits may leave their permanent coastal quarters during the passage season to visit inland sewage farms, watercress beds and low-lying, wet localities. At the same time, visiting Water Pipits can be encountered in similar habitats.

Tawny Pipit

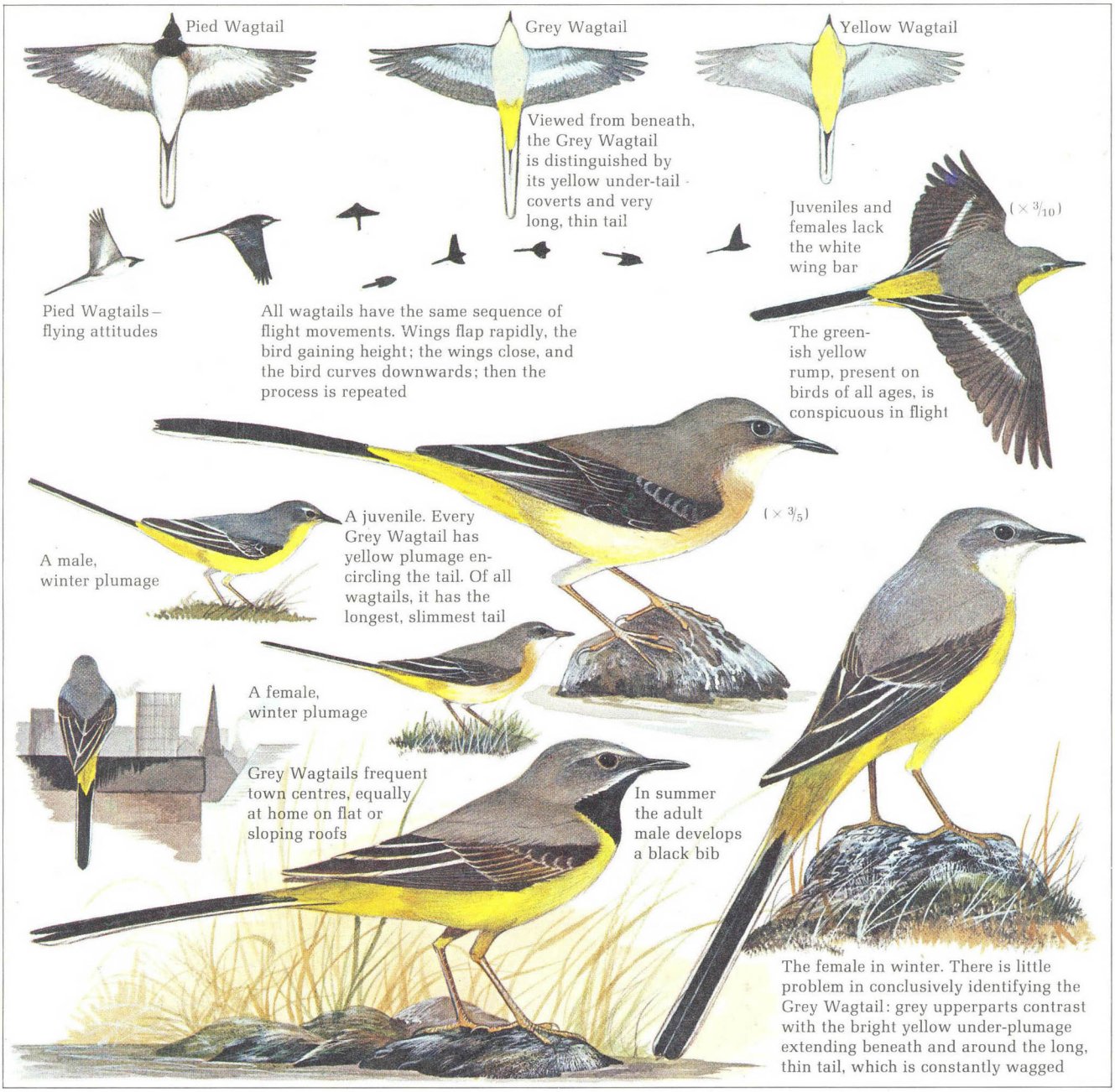


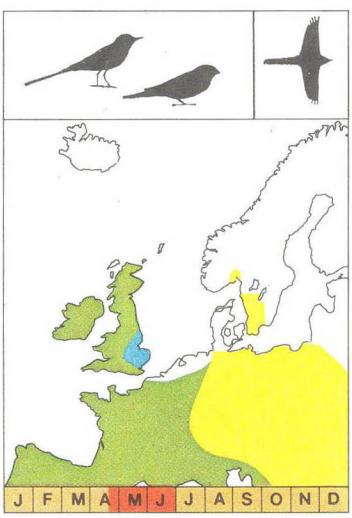
The Tawny Pipit prefers more barren terrain than other European pipits, choosing extensive heaths, sand dunes, limestone hillsides and dry uplands. In some areas, such places have been planted with conifers, resulting in their abandonment by this species. It is, nevertheless, widely distributed throughout Europe and Asia, though only occurring in small numbers in Britain while on passage, and absent as a breeder from most of Denmark.

Tawny Pipits return to their breeding areas in late March and April. Males proclaim their territories with song flights, but the song is rather poor – a simple repetition of clear metallic notes. The nest is sited in a depression on the ground, concealed by a clump of grass, bramble or heather. It is a rather substantial structure of grass, roots, even bits of seaweed, lined with fine grass and hair. Both sexes are believed to incubate, a process lasting 13 to 14 days, and both certainly feed the young during the 12-day fledging period. Four or five eggs are usual. Second broods may occur in southern parts of the range.

The main wintering areas of European and many Asian birds are dry and desolate plains in the southern Sudan. Here, they are usually seen singly or in pairs, but by the end of February they are associating in larger groups and indulging in courtship chases preparatory to their return to the breeding grounds.

Grey Wagtail

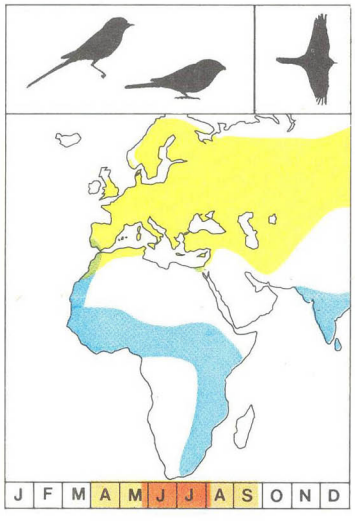




This is the most graceful of the wagtails, its nimble actions and handsome plumage lending added enjoyment to a walk by a rushing stream. Because of a fondness for fast-flowing water, it tends to be found in hills and mountains, up to 8,000 feet in the Alps. However, it occurs in some lowland areas and occasionally well away from water when nesting in a man-made environment such as a bomb site or quarry. Such occurrences illustrate the birds' dependence on cavities for nest sites. Crevices in river banks, usually screened by vegetation, are the typical situation, but holes in brickwork on bridges or buildings are a favoured substitute. The nest is of grass and other vegetation, warmly lined with hair. It is built by the female, who also performs most of the incubation. The clutch of four to six eggs hatches in 13 to 14 days, and the young are fed by both parents, leaving the nest after 12 days. A second brood is often raised.

Grey Wagtails feed on a variety of insects found near water, including may-flies, gnats and beetles, as well as small molluscs and crustaceans. They regularly perch in trees, unlike other wagtails, and often make aerial sorties to capture passing insects. The call is high pitched and very brief; a long drawn note is used as an alarm, and a pleasant song incorporating a trill is to be heard in spring. European Grey Wagtails are residents or short-distance migrants.

Yellow Wagtail

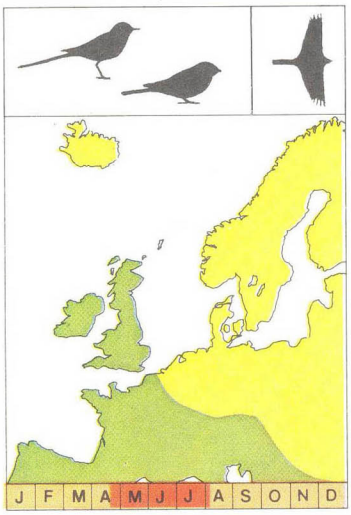


Ornithologists are fascinated by the kaleidoscopic variety of male head patterns in the many geographical races of Yellow Wagtail, especially since birds identical to far-distant races may occur and breed amongst those of a quite different form. Thus, in Britain, the normal breeding birds are of a yellow-headed race, but here and there are small pockets of grey-headed birds identical to the form breeding in western Siberia. It is thought that such abnormalities occur through interbreeding with birds of other races. Whatever the colour of the male, all Yellow Wagtails have similar habits. They are typically birds of damp meadowland with a partiality for cattle pastures.

Males arrive about a fortnight ahead of the females and they nest in a depression in the ground, well hidden under vegetation and often lined with cattle- or horsehair. Five or six eggs are laid, densely freckled with yellowish-brown. They are incubated by the female and the young are fed by both parents.

These are exceedingly wary birds, the male calling the female off the nest when an observer approaches within 100 yards. Their behaviour at such times, and the "tsweep" alarm note, makes them seem more like (the related) pipits than wagtails. Two broods are usually raised before departure to the winter quarters. Yellow Wagtail populations in western Europe have recently shown signs of a decline.

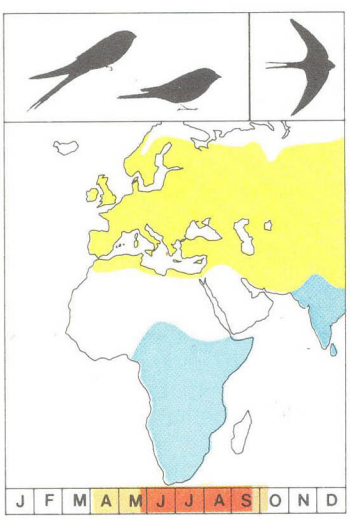
Pied Wagtail



The elegant plumage and graceful actions of the Pied Wagtail are a familiar sight around human dwellings nearly everywhere in Europe. Almost any habitat will suit it if there are open areas where it can find insects and sheltered crevices to site the nest. Its natural choice is the vicinity of shallow streams, where shingle spits and adjoining grass provide feed and the banks offer nest sites, but it is equally at home feeding on lawns in a city park, with a nest in a nearby building. Insects are caught on the ground by sudden dashes and swerves. During June, roads through woodland attract many Pied Wagtails, which gather caterpillars that have fallen from overhanging trees to lie clearly exposed on the road. Despite this, these nimble birds rarely fall victim to passing cars. The nest is bulky and untidy, made of grass and coarse scraps, with a thick hair and feather lining. Nests around buildings are regularly sited on such strange places as farm machinery or ledges in sheds. The clutch of four to six grey spotted eggs is incubated by the female, the male helping for short spells with the first brood. When the young hatch, they may be fed mainly by the male while the female lays and incubates a second clutch.

Outside the breeding season, Pied Wagtails roost communally in thickets or buildings, sometimes in assemblies of several hundreds which are often found in glasshouses.

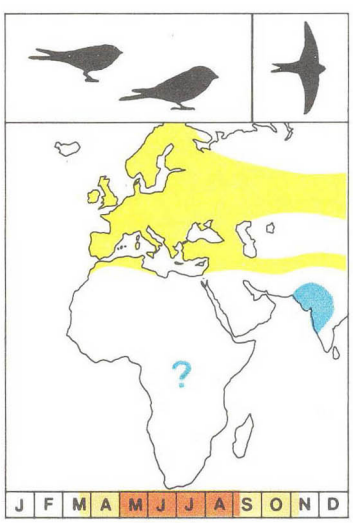
Swallow



The Swallow has been a welcome guest of human habitation from the earliest times. Unlike House Martins, Swallows generally nest inside buildings, showing a preference for farm sheds. They reach Europe between March and June, successive waves passing over earlier arrivals. Individual birds usually return to the same place, and may even reuse last year's nest, but the chances of both members of a pair surviving migration hazards are only one in five. Even when both return, reshuffling of pairs often occurs.

Four to six eggs are laid, and two or three broods are reared. Incubation and fledging periods are long, and nestlings may be found well into September. The Swallow captures aerial insects lower than House Martins or Swifts, often taking prey while skimming meadows or water. Although, unlike most passerines, it can feed on migration, it still suffers considerable mortality on its journeys, which from Europe involve a trans-Sahara crossing. Its routes and schedule are known in detail. British Swallows winter in southeastern and southern Africa, Dutch and German birds more centrally in the same region, and those from Russia to the north and west. Autumn migration lasts a leisurely two months, while spring return takes only one. Some Swallows have recently stayed to nest in South Africa, but with 15 native species of swallow to compete against, this is unlikely to become a general trend.

House Martin

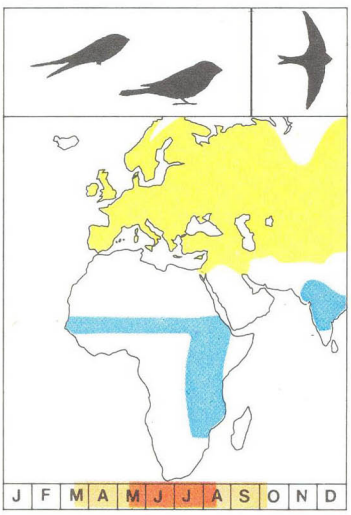


The House Martin's nesting association with Man was well known to Shakespeare ("no jutty, frieze, buttress, nor coign of vantage, but this bird hath made his pendent bed . . ." – Macbeth, Act 1, Scene 6), but its ancestral home was mountains or coastal cliffs. There are House Martin colonies in towns and villages throughout Europe, varying from one or two nests to several hundred. Where pollution in cities has been brought under control, the aerial insect population has flourished and House Martins have moved in, nesting even on stark modern buildings. Colonies still occur on cliffs in remote mountainous regions, sometimes above the tree line at altitudes up to 14,000 feet.

House Martins can be tempted to nest under eaves in artificial nests, and once one pair is in occupation, others may come to nest near by. The major problem facing House Martins is the continuous take-over of their nests by House Sparrows. Clutches of four or five are normal. The parents share incubation duties, and other young from a previous brood may assist them in feeding nestlings. The fledging period is generally long – up to three weeks – and with two or three broods per year the last may leave as late as October.

House Martins arrive from Africa in April and May, congregating over reservoirs before dispersing to colonies. Return migration may be as late as November and late migrants sometimes fall victim to bad weather.

Sand Martin

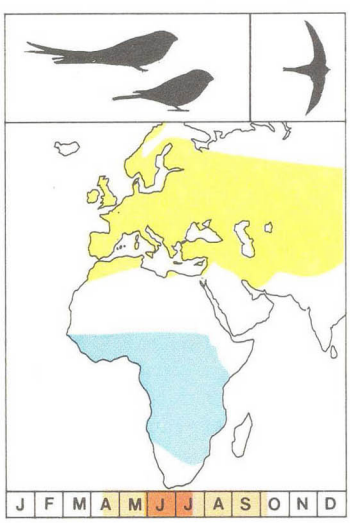


As more and more of the landscape disappears under a mantle of concrete, most birds find their habitats reduced. The Sand Martin is one of the few that do not: sand and gravel workings thrown up by the building industry provide it with an abundance of new breeding sites.

Natural sites for the Sand Martin's colonies of nesting tunnels are river banks or sand cliffs. The birds arrive early in spring, and cold spells may force small groups to huddle in tunnels for survival. Excavation, performed, incredibly, with the tiny feet, is an activity causing great excitement in the colony, and the resulting tunnels are two to four feet deep ending in a chamber lined with grass and feathers. Many birds make use of last year's holes, but if the sand face has collapsed in intervening months, they can establish new colonies at great speed.

Four or five white eggs are laid, and incubated mainly by the female. They hatch in a fortnight, and as with other hirundines there is a long fledging period of about three weeks. Newly fledged young remain around the colony for a few days, indulging in excited aerobatics and in chases (which adults may join), with a feather carried by one bird as an object of pursuit. While a second brood is raised, the first leaves for new feeding areas, often moving several hundred miles. By autumn, the birds have formed huge communal roosts in reeds or osiers.

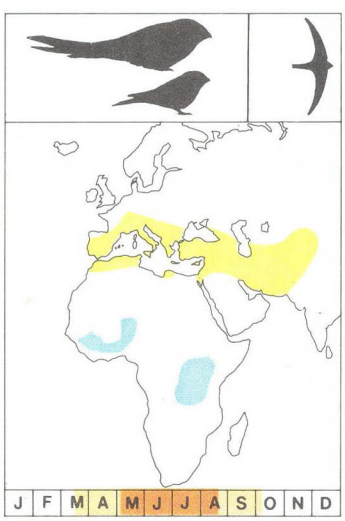
Swift



Summer has come when parties of screaming Swifts flicker around the rooftops on knife-like wings. Their arrival at the nest sites ends a period of over nine months spent entirely on the wing, for these are the most aerial of birds, feeding, mating and even sleeping in flight. Their food is aerial insects, caught with the aid of an enormous gape. Their legs are tiny, with all four toes pointing forwards for clinging to vertical surfaces. The needle-sharp claws can be excruciating to an unwary human handler.

Nests are built in crevices in buildings, and the breeding cycle which takes place in these dark and secret places is remarkable. Nest material, which includes straws and feathers, is caught in flight and cemented with saliva. Two or three white eggs are laid, extraordinarily elongated in shape. In collecting the insect food, which is delivered to the young as a compressed ball, each parent flies some 500 miles a day. Cold, wet weather may force them to forage far from the nest for long periods. Consequently, the eggs are resistant to chilling, and the young can withstand several days of starvation. At such times, young Swifts become torpid at night, their temperatures falling from the normal 101°F to as low as 70°F. The young spend five to eight weeks in the nest–longer than other birds of this size: they depart for Africa immediately after fledging, for which voyage extra growth is required.

Alpine Swift



Largest European representative of its family, the Alpine Swift's wings may span over 21 inches, with weight double that of the Common Swift.

Alpine Swifts show similar aerial specialization to their smaller relative, and probably fly even faster. Their food averages larger insects, including bees, and evidence suggests they select the stingless drones, though one bird examined had 11 stings in the gullet.

Breeding sites include mountains, caves and crevices in buildings. Some are age-old, as in medieval buildings and churches in Switzerland. Outside Europe, the species is by no means confined to mountain areas, nesting commonly in dilapidated buildings in Middle Eastern cities, where the loud trilling call mingles evocatively with the exotic hubbub around them. Displaying groups sweep silently round the nest sites, then burst into chorus. Like the Common Swift's, site entrances permit a free drop to reach flying speed, but inside, the birds are prepared to scramble or slide a long way to the nest. Nest material includes many outer cases of tree buds, mixed with saliva to form a cement. Two or three eggs are laid.

European Alpine Swifts winter in equatorial Africa alongside resident local races. During summer, weather movements sometimes occur: in 1917, a flock of 100, fleeing a depression, reached the southeastern coast of England.

Dipper

R

The continental race, known as the Black-bellied Dipper, has all dark underparts

Even in its very rapid flight up- and downstream the Dipper's white breast makes it unmistakable. A fat, lively, bobbing bird

(× 3/10)

When closed, the Dipper's white upper eyelid makes the bird look as if it is winking. This species uses its nictitating membrane, a transparent third eyelid, to protect the eye underwater

A young Dipper has grey upperparts and more white plumage below than an adult

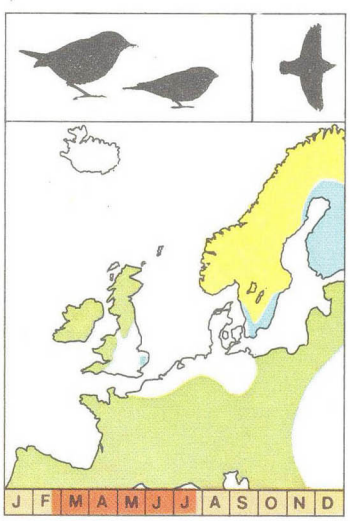
Below the surface, the Dipper appears silver-grey, and the water pressure makes its outline sleek. Anchorage is a pebble on the river bed grasped in the strong claws

(× 3/5)

A Dipper will build its domed nest behind a waterfall, reaching it by flying through the torrent

Swimming with its wings open, right, the Dipper looks like a land bird that has alighted on the water by mistake. Below left, the bird walks rather than dives into the stream to forage for food

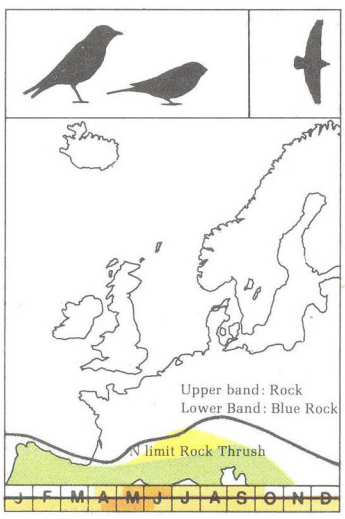
Rufous-brown underparts distinguish the English race of Dipper. In this species, wear makes the feathers turn brown—a newly moulted bird has grey upperparts like the continental bird, top left



A strange and fascinating bird, the Dipper is hardly ever found away from swiftly flowing rivers. It is completely unmistakable, though the pied plumage can be surprisingly inconspicuous against a background of jumbled rocks and foaming water. The diet is a variety of water insects, including beetles, water boatmen and dragonfly and mayfly larvae, many of them obtained under water. To do this, the bird deliberately walks into the water, or sometimes dives, and then continues to walk over the bottom seeking food. This feat seems impossible, especially since the bird's buoyancy is increased by an insulating layer of air trapped in its unusually thick plumage. Nevertheless it happens, and is apparently achieved by continual wing movements to force the body down. The Dipper can also swim efficiently, despite its lack of webbed feet.

The territory of a pair of Dippers is a stretch of river about half a mile long, though this varies considerably. Both sexes proclaim their ownership with a loud song, which contains trills and grating noises. They usually build their nest in a crevice in a rocky bank, or very often in a bridge or weir, and sometimes behind a waterfall. It is domed, and made of moss with a lining of dead leaves. Four to six white eggs are laid, and incubated by the female for 16 days. The young remain in the nest from 19 to 25 days and two broods are normally raised.

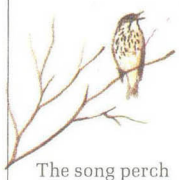
Rock Thrush–Blue Rock Thrush



The Rock Thrush is a wary bird, and despite its vivid colouring is not always easy to see in its habitat of rocky mountainsides. Nimble and active while feeding, it seeks its food mainly on the ground. Insects form the bulk of the diet, many of them quite large, and even lizards and frogs are regularly taken. Melodious, warbling phrases make up the song, which is rather similar to that of the Blackbird. It is usually uttered from a prominent rock, but sometimes while flying. Courtship includes a spectacular display flight in which the bird glides down in circles from a great height. Nests are built in crevices among rocks and consist of grass, roots and moss. Building and incubation are carried out by the female, the clutch of four to six eggs hatching after 14 to 15 days. Both sexes feed the young, which remain in the nest for 14 to 16 days. Rock Thrushes are fully migratory.

Blue Rock Thrushes are found in similar but even more barren areas than those favoured by the Rock Thrush: the rocks and cliffs around the ruins of Delphi are a typical example, and a perfect setting for such a beautiful bird. Generally similar to the Rock Thrush in most of its habits, it differs in being mainly resident, and in the appearance of its nest. Often very shallow, the nest of the Blue Rock Thrush is always more loosely constructed than the neat cup built by its close relative.

Song Thrush



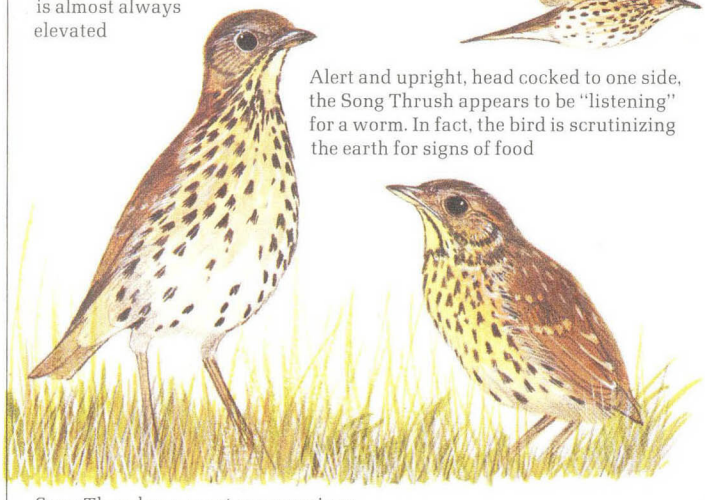
The song perch is almost always elevated

Some are surprised to find that such a familiarly plain garden bird has an orange underwing, and take the Song Thrush for a Redwing

Flight is direct and only slightly undulating. Identifying the species in this view is difficult. Its wings beat a fraction faster than the Mistle Thrush's. Only the experienced can tell it from a Redwing, and then only by overall character

(× 3/10)

Alert and upright, head cocked to one side, the Song Thrush appears to be "listening" for a worm. In fact, the bird is scrutinizing the earth for signs of food

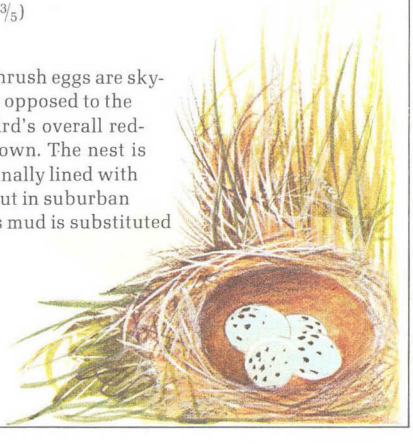


Song Thrushes are not as gregarious as they seem, usually going about in pairs. A party of ten on a football pitch is likely to be five pairs widely spaced. On the ground, Song Thrushes hop or run, but seldom walk

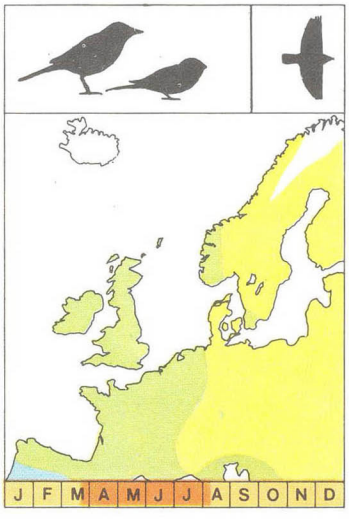
Quite a different facial expression to that worn by the Mistle Thrush. Song Thrushes have gentle dispositions, backing away when, for instance, a Starling is aggressive

(× 3/5)

Song Thrush eggs are sky-blue, as opposed to the Blackbird's overall reddish brown. The nest is traditionally lined with dung, but in suburban gardens mud is substituted



Snails are hammered open on stones

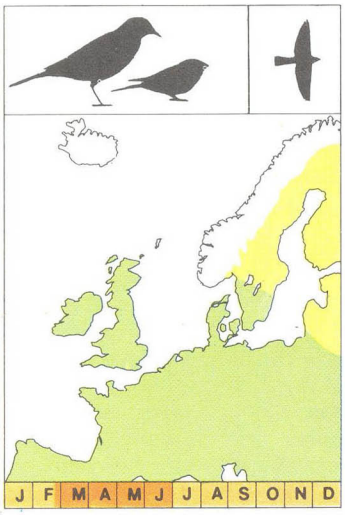


Mild weather in January will often trigger the first bursts of song from the common thrush, and because each phrase is repeated several times, it is probably the easiest to recognize of all garden bird songs.

Song Thrushes, along with Blackbirds, Robins and Starlings, are a familiar sight on lawns and flower beds throughout the year. Worms are their main food during the first half of the year, with caterpillars during May and June and fruit during autumn. Snails become important during cold winter weather or at any time when other food sources fail. They are smashed against a stone, which may be used repeatedly while the bird systematically clears snails from a nearby patch of ground: an almost legendary aspect of Song Thrush behaviour.

With four bright blue, black-spotted eggs against the unique mud lining, the Song Thrush nest is an attractive sight. Unfortunately, it is also easy to find, and the species suffers nearly as badly as the Blackbird from human predation. Bushes and trees are the usual nest site, ground situations and buildings being much less often used than by the Blackbird. Construction is effected by the female, who moulds the interior to a smooth cup with her breast. Ivy seeds are often used to ornament the rim. She alone incubates, but both sexes tend the young and two or three broods may be reared. The Song Thrush is a partial migrant.

Mistle Thrush

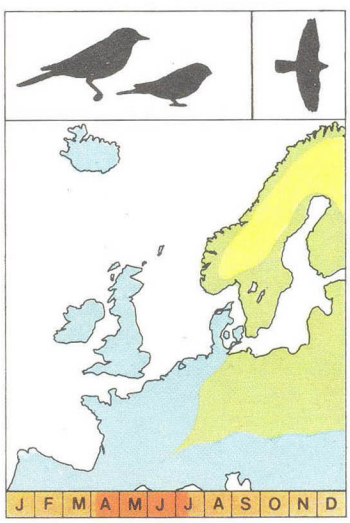


"Stormcock", the country name for this bird, is highly suitable: it sings loudly from high perches on blustery days in early spring. Mistle Thrush is no less apt a name, for it does indeed specialize in eating mistletoe berries in winter, and in the process renders invaluable aid to this parasitic plant in transporting its seeds to new host trees.

At other times, the Mistle Thrush may be seen seeking invertebrate prey in open areas such as playing fields, usually preferring these places to the small suburban gardens frequented by Song Thrushes. Possibly due in part to its feeding habits, the Mistle Thrush is nowhere as abundant as other thrushes, but holds unusually large territories.

Parkland, or suburban areas with tall trees, are typical breeding habitats, although orchards consisting of quite low trees are also favoured. Nests are generally placed higher than those of other thrushes, often on a horizontal limb close to the trunk. Site selection by the female may be seen in early spring as she squats in various likely spots before finally approving one. Three to five eggs are laid, incubated by the female for 13 to 14 days, and both parents feed the young for 14 to 16 days. Two broods are reared. It has been established that about 62 per cent of the young die before the end of their first year, but subsequently annual mortality drops to 48 per cent. These figures are likely to be much higher in a severe winter.

Fieldfare

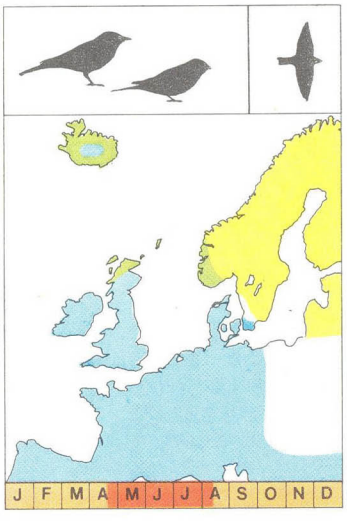


Harsh chuckling calls from passing Fieldfares are a characteristic sound of farmland in winter, but one which is being heard increasingly during summer, too, as the species extends its breeding range. Fieldfares first colonized central Europe in the early nineteenth century and a new phase of expansion has added them to the breeding list in Greenland (since 1943), Denmark (since 1960), Scotland (since 1967) and Iceland (since 1969). The spread may be due to climatic change, but must be aided by the fact that Fieldfares are no longer trapped for food—a practice conducted on a massive scale during the last century.

Typical Scandinavian breeding areas are in birch woodland, though various other habitats are now exploited, including parks and gardens in towns. Fieldfares nest colonially, with nests in adjacent trees—sometimes up to five in a single tree. Humans entering a colony face angry cries, dive-bombing and a liberal spattering of excrement. The nest is of twigs, grass and mud lined with finer grass. Four to six eggs are laid, which hatch after 13 to 14 days of incubation, mainly by the female. Both parents feed the young.

Slugs, insects and earthworms are staple foods throughout the year, supplemented by berries in winter, and flocks often visit orchards to feed on fallen apples. Fieldfares roost communally, preferring the ground to bushes or trees.

Redwing

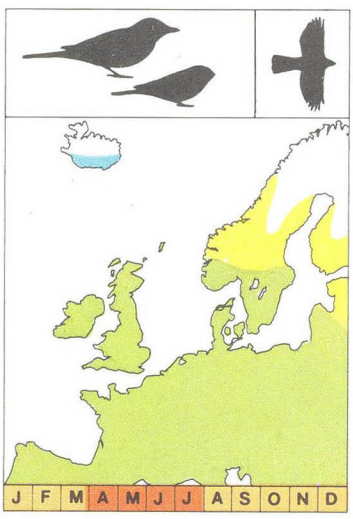


Snowfalls or hard frost may bring Redwings into suburban gardens. Their soft, lisping call can be heard at night over any part of England, including London; but for much of the winter they shun human habitation, feeding in open fields with Fieldfares, or sometimes Golden Plovers and Lapwings. Berries, such as holly and hawthorn, are eaten in large quantities, bringing the birds into hedgerows and thickets.

At night, Redwings roost communally in hawthorn scrub, laurel or rhododendron, flying in high in small parties and dropping down vertically to perch in the tops of the bushes. It is possible to trap large numbers of the birds for ringing at some roosts, which has resulted in the discovery that Redwings are highly mobile throughout the winter, moving long distances to avoid hard weather, or to return to old haunts when conditions improve.

Like the Fieldfare, its breeding range is extending, and it now nests regularly in Scotland. Although nests tend to be grouped, unlike the Fieldfare it does not form clearly defined colonies. The nest is a typical thrush structure, made of grass and birch twigs, inside which is a mud cup lined with finer grass. Sites chosen are mostly low down, often on fine twigs near the base of birches. Five or six eggs are laid, and both sexes incubate them for 13 days. The young are fed by both parents and fledge after 12 to 14 days.

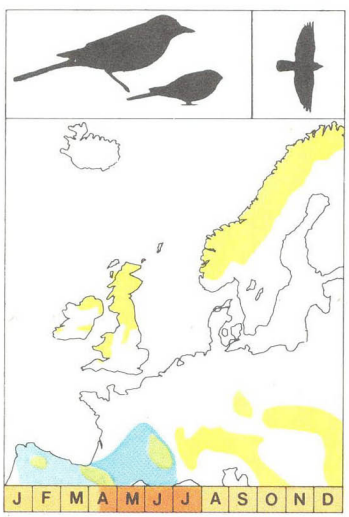
Blackbird



Often very easy to see and easily accessible, Blackbirds' nests are plundered by small boys more often than those of any other bird. Despite this hazard, the species remains one of the commonest in many parts of Europe, due to its versatility in exploiting new habitats created by Man. Originally a woodland bird, it now thrives on agricultural land and in urban areas, reaching maximum density in suburban gardens. Food eaten ranges from worms and other invertebrates to fruit and household scraps.

The nest is of grass, reinforced with mud and lined with finer grass. Bushes and small trees are typical sites, but nests on the ground or on buildings are common. Because so many Blackbirds' nests are found, by ornithologists as well as vandals, a great deal of information has accumulated on their breeding biology. Nesting takes place from early March to late July or even August, but the greatest success rate is achieved by very early and by late nests. Early nests succeed because predators are less active at this time; late nests because summer foliage offers greater concealment. Three to five eggs are usually laid. Clutches are largest during May and are also higher on average in rural areas than in suburban ones. Incubation is by the female, but both sexes feed the young; three or more broods may be reared in a single season, during which the same nest is frequently reused.

Ring Ouzel

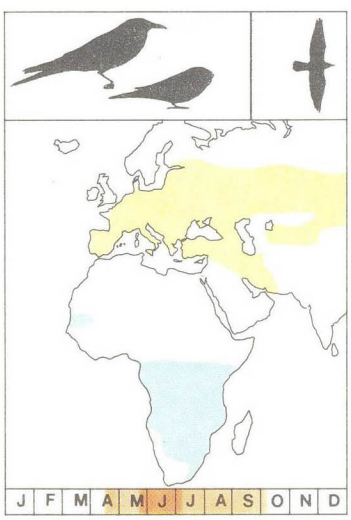


In moorland and mountain habitats the Blackbird is completely replaced by its near relative, the Ring Ouzel. This species particularly favours sheltered places in glens and gorges: unlike the Blackbird it is shy and shuns the neighbourhood of human habitation. Exceptions to this rule occur in autumn, when it may visit gardens to feast on cultivated berries, but even then such forays are usually confined to the early morning. At other times, various invertebrates constitute its diet. Clear single or double notes repeated three or four times after well-marked intervals comprise the Ring Ouzel's loud, piping song.

The nest resembles a Blackbird's in construction, but has a distinctive appearance due to the use of materials such as heather and moor grass. Vegetation overhanging the top of a cliff or peat bank is a common site, but low trees are occasionally used, and the alpine race sometimes nests quite high in conifers. Ring Ouzel nests are much more difficult to find than those of Blackbirds. One method which has been employed is the use of a border terrier: the birds have an unusually strong smell, which the dog detects with ease.

Two clutches of four eggs are usually laid, and incubation and fledging periods each last a fortnight. The duties of nest-building, brooding and feeding the young are shared between both sexes.

Golden Oriole

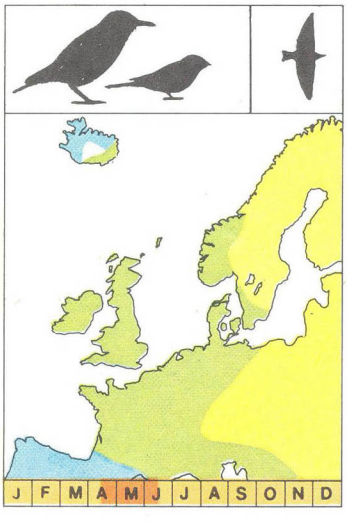


It is the dappled background of sun and shade which allows the Golden Oriole to blend so surprisingly well with its normal habitat of the tree canopy. Younger females, with green underparts (rather than the golden yellow variant of the mature female), are the most difficult to locate of all. However, the birds are often revealed by their far-reaching and distinctive call, a liquid whistle of four syllables.

Golden Orioles occur in various woodland or parkland habitats, normally of broad-leaved trees. Foraging almost exclusively among the leaves, they capture a wide variety of insects, often rather large ones such as cockchafer beetles and even bumble-bees and hairy caterpillars. The prey is sometimes picked off leaves while the bird hovers. In late summer and autumn a great deal of fruit, especially figs, is consumed.

Suspended from a horizontal forked branch, the beautiful nest is built entirely by the female. Because it is frequently blown about, the nest cup is made very deep to reduce the danger of eggs or young tumbling out. Long strands of grass, leaf strips and bark are basic materials, with moss and lichens dotted about the exterior. Two to four eggs are laid, and incubation and fledging periods each last two weeks. Both sexes incubate and tend the young, feeding by regurgitation at first, and with whole prey later. As a rule, one brood is raised.

Starling

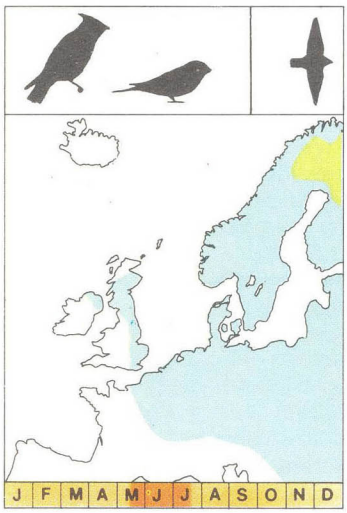


Starlings are noisy and dirty, but they are an impressive spectacle when they gather to roost, circling in dense flocks often many thousands strong. Two centuries ago they were much less abundant, depending on holes in trees for nesting, and for thickets or reedbeds for roosting. Now they make use of buildings for those purposes, and this has created a pest problem in many cities, not only in Europe but in the USA and various other parts of the world to which the species has been introduced.

These birds can find food almost anywhere, but their preferred feeding grounds are pasture or lawns. Worms and insect larvae are the prey in such situations, but Starlings differ strikingly in their feeding methods from the various thrushes which often search for similar prey alongside them. Whereas thrushes spread out widely and look around them for partly exposed prey, Starlings feed close together, moving in the same direction and excavating for invertebrates by repeatedly thrusting the bill into the ground and then opening it.

Rather surprisingly, in view of their abundance, most Starlings rear only one brood each year. Nest foundations are made by the male, and to his untidy mass of grass and straw the female adds a feather lining. Four to seven eggs are laid, hatching after 12 to 13 days. Fledging takes a comparatively long time – three weeks.

Waxwing



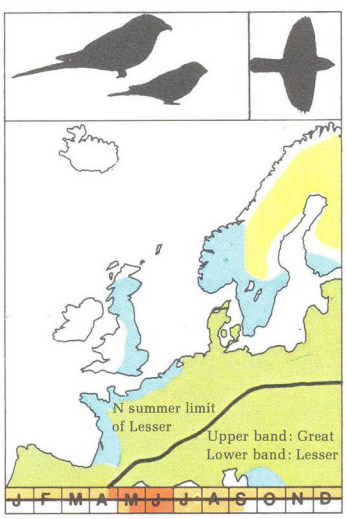
Waxwings are strange-looking birds, though none the less beautiful; with their crests, black masks and colourful wing markings they resemble no other common species. It is small wonder that their periodic visits in large winter flocks to areas where they were normally unknown aroused interest and sometimes even superstitious dread in times past. Like crossbills and Redwings, Waxwings show irruptive behaviour.

They are far-northern breeders, nesting in Scandinavia and the USSR. In most years, a sizeable population stays fairly close to home, while a smaller number migrate to central Europe. About every ten years, apparently as a result of population pressure, Waxwings move *en masse* out of Scandinavia and the Russian taiga to winter in great numbers throughout Europe. In these years, they are seen regularly in southern Europe and Britain, where usually they are very scarce visitors.

Berries, particularly those of rowan, are the staple winter food—a resource for which they compete with Fieldfares and Redwings. In towns, cotoneaster and pyracantha are favoured. On the breeding grounds, food is mainly mosquitoes.

Waxwings nest in birch or coniferous forest. The chosen site is often a tree on the forest edge, or by a lake or stream. Conifer twigs, lichens and grass are the building materials, and the cup has a lining of hair and down.

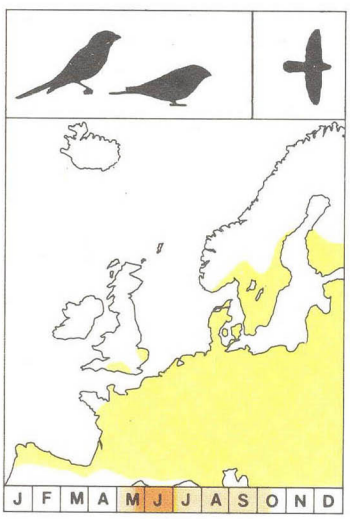
Great Grey—Lesser Grey Shrikes



Shrikes are impressive birds which have evolved a way of life and physical structure resembling those of the smaller hawks. The Great Grey Shrike is the largest and most formidable species of the family occurring in Europe, its diet consisting of small birds and mammals (or, in the south, frogs and lizards), with a small proportion of large insects. The Lesser Grey Shrike eats beetles, mole crickets, grasshoppers and other insects. Shrikes are well known for their habit of setting up "larders" by impaling prey on thorns—or occasionally barbed wire: the Great Grey Shrike regularly treats its prey in this way, but the Lesser Grey appears to have abandoned this practice.

Northern populations of the Great Grey Shrike are migratory, often visiting the same territory regularly in successive years. They inhabit a wide range of country, including scrub, woodland edges and marshes; Lesser Grey Shrikes choose orchards, vineyards and wooded roadsides. Both species build large untidy nests in bushes or trees. Those of the Lesser Grey tend to be placed higher, and are often grouped in loose colonies. Clutches of five to six eggs are usual for both species, though in the north, where there is only time for one brood, Great Grey Shrikes may lay up to eight or nine eggs. Young Great Grey Shrikes fledge in about 20 days, but Lesser Grey fledglings leave the nest after two weeks, still barely able to fly.

Red-backed Shrike

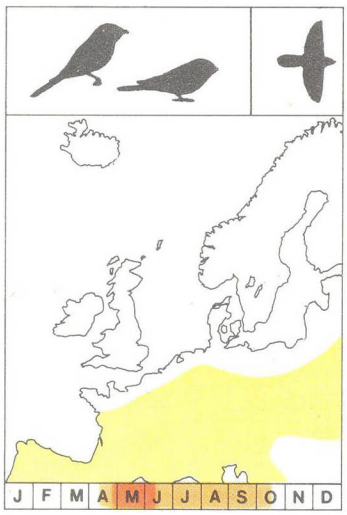


Red-backed Shrike populations have declined seriously in the northwestern part of their range, and in Britain the species is rapidly becoming extinct as a breeder. There is no shortage of suitable habitats, and the beetles and bumble-bees which form much of its diet still seem common, despite alleged reductions in food supply due to climatic changes. A factor which must therefore be taken very seriously is the damage done by egg-collectors. Red-backed Shrike eggs vary extensively, and are therefore much prized.

In hunting and feeding methods the bird is typical of its family. Much of the prey is located from a look-out post, often at the top of one of the scattered bushes which are a prime requirement in its habitat. Occasionally the bird hovers to search a likely spot, or flies low past bushes to disturb possible prey. Victims include not only large insects, but nestlings or even adult small birds, lizards and rodents. These are often seized and carried with the feet, in the manner of a hawk, the beak being used for killing. The "larder" habit is well developed.

A thorny bush is usually chosen as the site for the large nest of moss, grass, wool and feathers, which is made mainly by the male. It is situated quite low, and the clutch varies from three to six eggs. Incubation is by the female alone, and lasts between 13 and 16 days. Both parents feed the young, which leave after about 14 days.

Woodchat

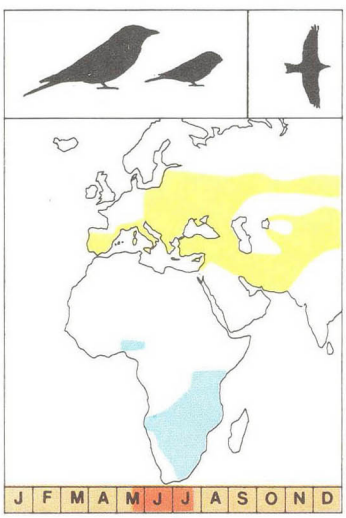


Olive groves or forests of cork oak are the Mediterranean environment of this small and handsome shrike. In the north, various types of open woodland may be favoured, and, like the Lesser Grey Shrike, the Woodchat is often seen on telegraph wires along roadsides. Hunting methods and choice of food resemble those of the Red-backed Shrike, and the two occur in the same habitats in some places; "larders" are regularly used. Like all shrikes, the Woodchat utters harsh, chattering calls, but its song is superior to those of its relatives, including melodious phrases and imitations of other birds.

Woodchat shrikes generally nest a good deal higher than Red-backed, usually on an outer branch of a tree or tall shrub. Nest construction is rather neater: the deep cup of roots and leaves is lined with feathers, hair and wool. Five to six eggs are laid, showing variability similar to that which has had sad consequences for the Red-backed Shrike (page 106). Incubation is carried out by the female, fed on the nest by her mate, and lasts 16 days. The young are tended by male and female, and spend longer in the nest than those of the Red-backed Shrike–19 or 20 days. Two broods are occasionally reared, though one is more usual.

North-bound migrants occasionally overshoot their Mediterranean breeding area, and small numbers of Woodchats are regularly seen in Britain during spring.

Roller



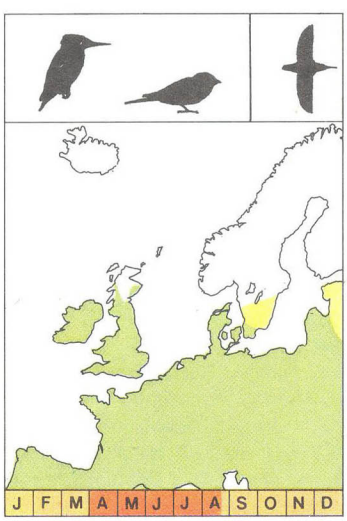
One of Europe's most beautiful birds, the Roller is unfortunately decreasing in range, possibly as a result of changing climate. It breeds typically in open woodland or parkland areas, which provide it with tree holes for nesting and perches from which it can survey open ground for prey. For the most part this consists of large insects, but occasional lizards, small mammals and even small birds are added to the diet. In winter quarters, the grasslands of eastern Africa, European Rollers associate with the native Lilac-breasted Roller.

The English name of this bird derives from the male's springtime display flight, in which he flies to about 200 feet and then tumbles downwards, twisting and somersaulting as he does so. These are highly vocal birds, the usual call, a grating "kri . . kri . . kri", often being uttered on the wing.

Rollers are hole nesters, usually selecting an old woodpecker's hole, or other tree site, or occasionally a cavity among rocks or in a building. As a rule, they do not build any nest inside the chamber, although a sparse lining of debris and feathers may be added. Four to five white eggs are laid. Both male and female incubate for 18 to 19 days, starting before the clutch is complete. Young Rollers are fed by both adults, jostling and fighting viciously for the food items brought by their parents: they leave the nest after about four weeks.

Kingfisher

R

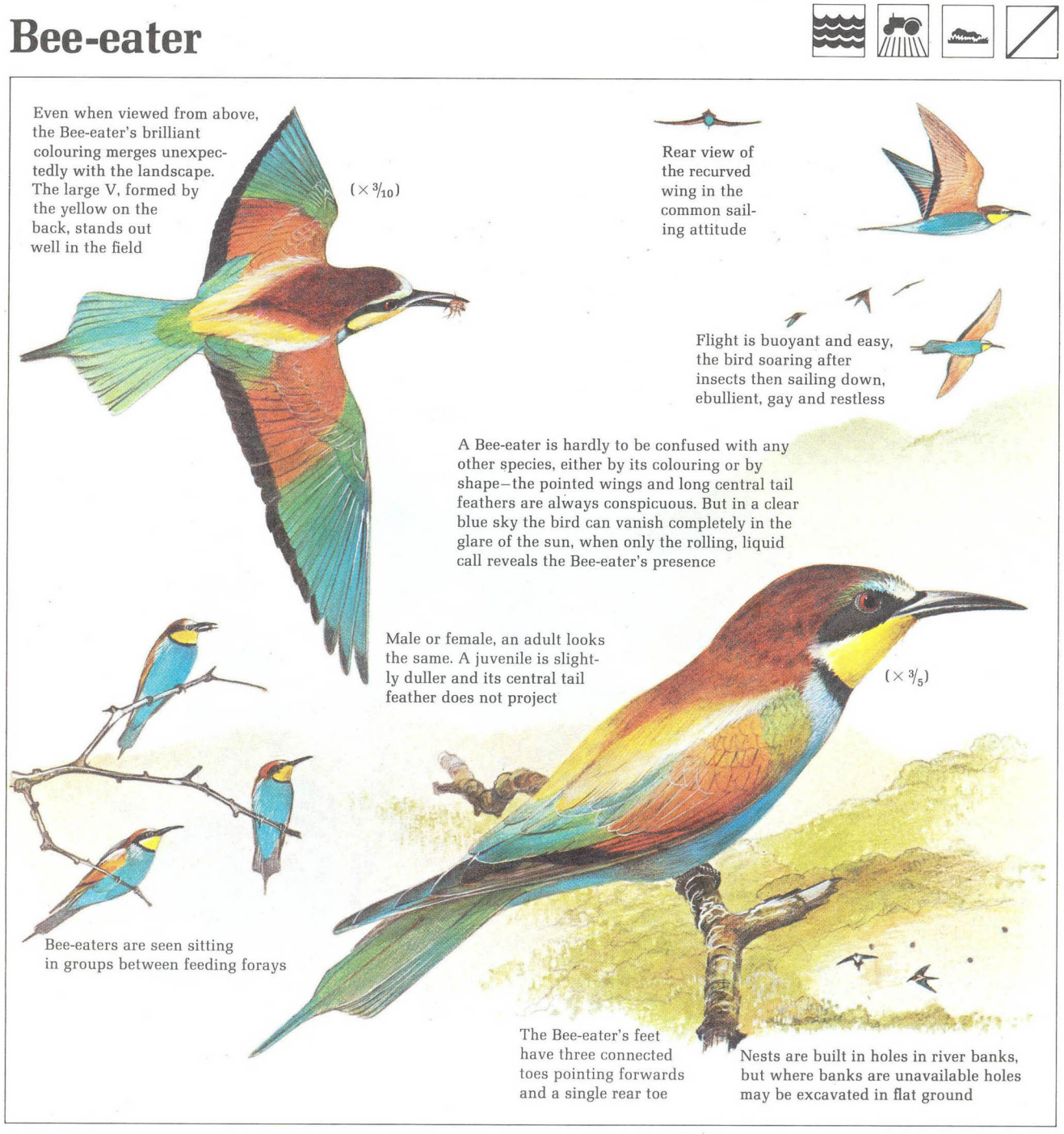


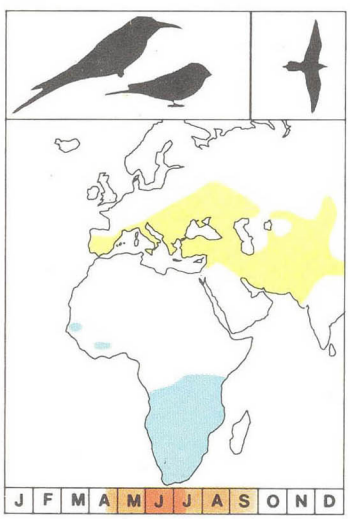
The Kingfisher's splendid plumage reminds us that it is a member of a predominantly tropical family. Although common enough on unpolluted waters, many people know it only from books, for it is shy and often surprisingly inconspicuous until it flies.

It catches fish by diving, either from a perch or after hovering. They are swallowed head first, and sticklebacks or bullheads are beaten unmercifully against the perch, for only when dead will spines or stiff fins flatten, making the fish safe to swallow. Courtship starts early in the year with high-flying aerial pursuits. Both birds excavate the nest tunnel, starting it off by flying at the river bank to drive in their bills. It may eventually extend three feet, and while one bird excavates, the other mounts guard outside. Seven white eggs are laid in early May on the bare soil of the nest chamber, and both parents share the three-week incubation period. The young spend three and a half weeks in the nest, fish remains gradually creating such filthy conditions that the adults have to bathe after each visit. Fledglings begin fishing practice soon after leaving, but their parents have to feed them until they are proficient. Many juvenile Kingfishers drown through diving too often and making their feathers waterlogged.

Young birds disperse in winter, some moving to the coast, while adults remain behind, male and female using different stretches of water until spring.

Bee-eater





These birds are aptly named: their diet is largely honey-bees, supplemented with wasps and a variety of other flying insects. A single bee sting would be fatal for most small birds, but Bee-eaters overcome the problem partly by an unusual immunity to bee and wasp venom, but mainly by their skill in de-venoming the worker-bee by rubbing the sting out against a branch. The birds also have the ability to distinguish non-venomous drones. Extracting the sting always requires a return to the perch, and the considerable amount of feeding done in flight is presumably confined to non-venomous insects.

The European Bee-eater is a summer visitor, wintering in southern Africa and in India. Recently, European Bee-eaters have been reported nesting in South Africa during the period of the northern winter; they depart northwards with the rest, but it seems unlikely that they breed again in Europe during the northern summer.

Nest sites, usually colonial, are in tunnels made in banks or soft cliff faces. These tunnels, up to ten feet long, are excavated by both male and female mainly with the feet. Four to seven white eggs are laid, almost spherical in shape. During incubation, the nest chamber becomes carpeted with insect remains from the pellets which they disgorge as an alternative method of defecation. Both parents incubate and feed the young.

Birds of Iberia

Two great barriers, the Mediterranean and the Sahara, separate Europe from tropical Africa. Nevertheless, some birds of the hotter latitudes are endemic in southern Europe and nowhere is there a greater diversity of these than in Spain and Portugal.

Short-toed Eagle: large raptor with long, broad wings and an unmistakable white plumage. Spain, southern Europe, Asia east to Urals, NW Africa. Soars and hovers over lightly wooded country

Booted Eagle: pale phase, left, more common than dark, below. Spain, N Africa, C Asia, in hill forest

(× 1/5)

Imperial Eagle: similar in size to the Golden Eagle but distinguished by white shoulders and pale nape. Spanish race now rare. Hunts over lowland forest, plains and marshland

(× 1/11)

(× 1/5)

Crag Martin: resembles Sand Martin but lacks throat band. Conspicuous white spots under tail. Spain, NW Africa; breeds on inland crags and coastal cliffs

(× 1/3)

Red-rumped Swallow: distinctive russet rump and nape. Spain, NW Africa, eastern Mediterranean—on cliffs and buildings

Eleonora's Falcon: pale and dark forms. Superb aerial hunter. Breeds on Mediterranean islands

(× 2/5)

(× 1/5)

Black Wheatear, above: cliffs and ravines in SW Europe; NW Africa

Egyptian Vulture: distribution encircles Mediterranean. Scavenger in open rocky upland and lowland

(× 1/2)

(× 1/8)

Black-eared Wheatear: southern Europe, eastern Mediterranean, NW Africa. In dry open country with scattered trees and bushes

Mountain Birds

Some of these species, such as the Snow Finch, are confined to mountain tops. Others may occur in lowland areas which have features, such as cliffs, or cold climate, characteristic of mountains. Thus, the Chough is found on rocky coasts, and the Ptarmigan occurs at sea-level in the Arctic. Vultures, including the Lammergeier, are likely to be seen only in flight.

Griffon Vulture: long, broad wings and short tail. Usually seen soaring, when the wings are raised to form a V. Spain, the Alps, SE Europe

(×1/22)

(×1/12)

Black Vulture: Griffon-sized. Always soars with wings horizontal. Spain and SE Europe

Rough-legged Buzzard: has paler underparts than Common Buzzard. Breeds in Scandinavia and winters elsewhere in Europe

Lammergeier: now gravely reduced in numbers. Spain, Alps, SE Europe

(×1/14)

(×1/11)

(×1/3)

Snow Finch: resembles Snow Bunting, but has a dark (not white) head and different choice of habitat. Basically Alpine but also found in Pyrenees

Alpine Chough: yellow beak. Pyrenees, S France, the Alps

(×1/5)

(×1/6)

(×1/11)

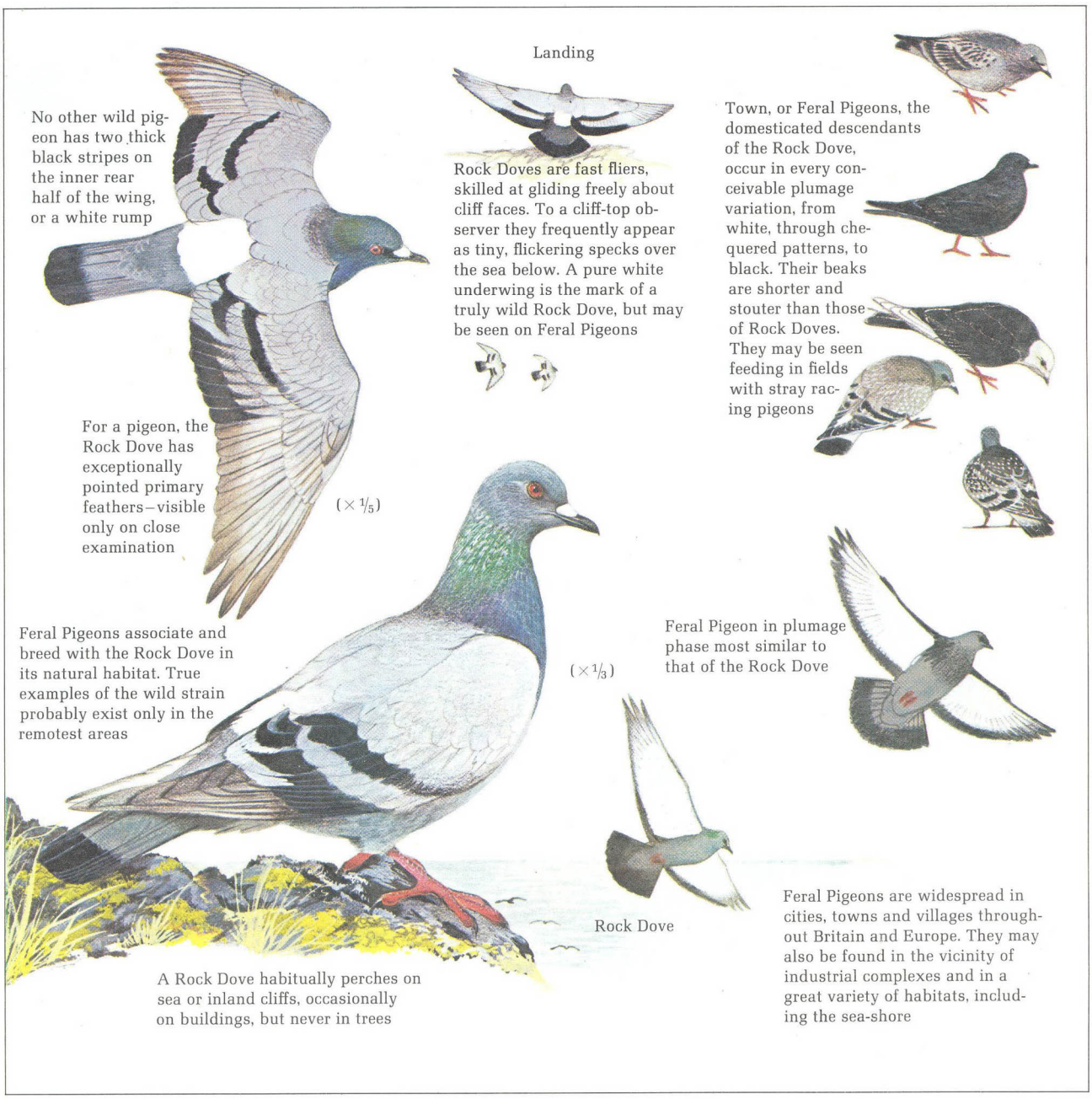
(×1/6)

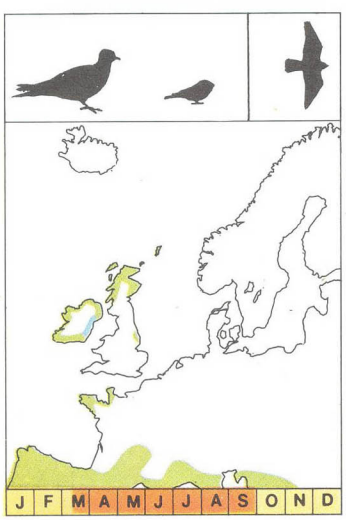
Chough: a long, red bill UK, Spain, the Alps

Ptarmigan, summer: male behind, and female. Scandinavia, Scotland, Alps

Ptarmigan, autumn and winter: autumn male behind, winter female and male in front

Rock Dove—Feral Pigeon





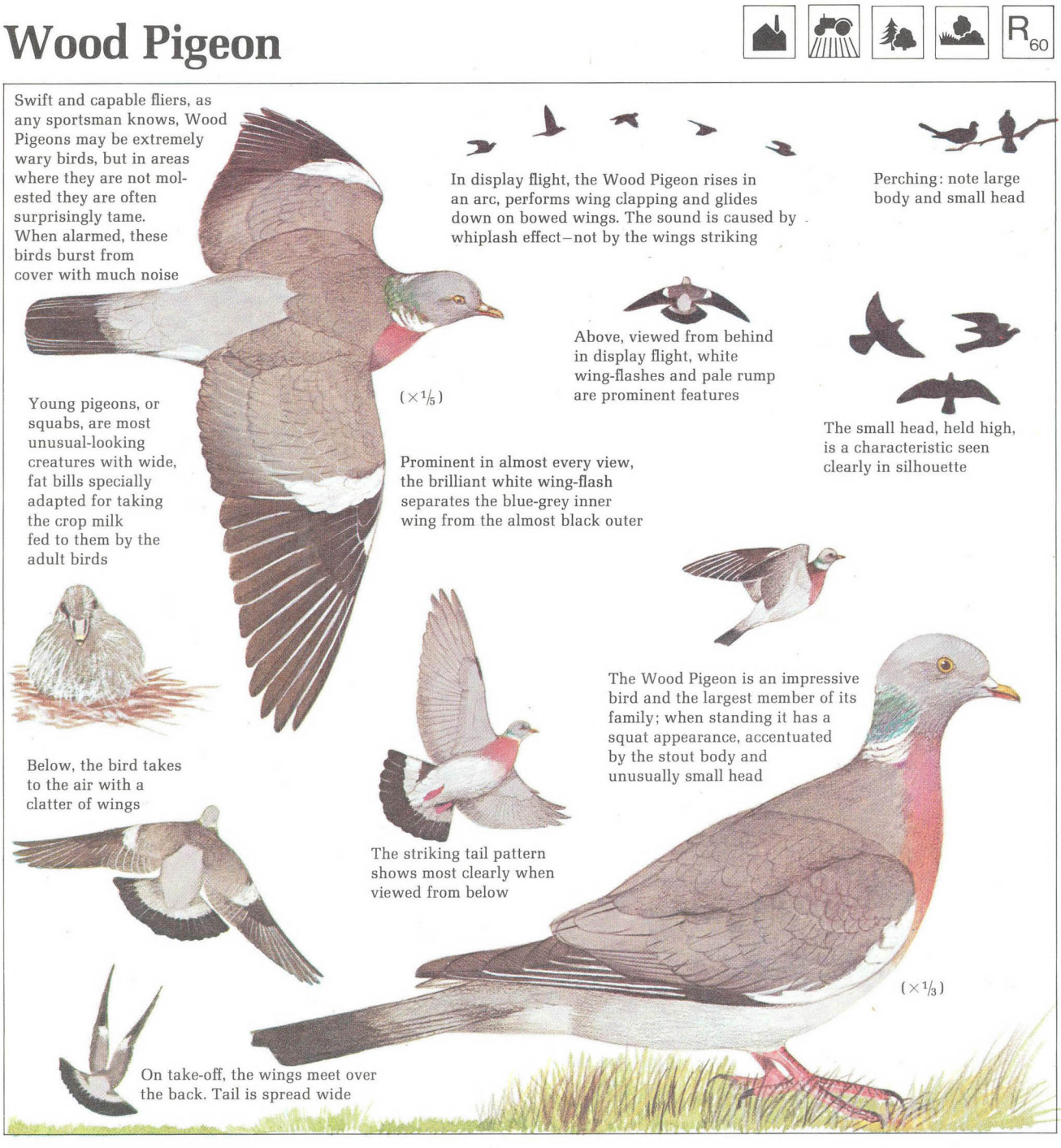
Trafalgar Square or St Mark's in Venice would be different places without their crowds of Feral Pigeons. These birds are familiar in cities throughout the world, yet to find the Rock Dove—the wild species from which Feral Pigeons are descended—it is necessary to visit remote and wild sea cliffs, or crags, often in desert or arid areas.

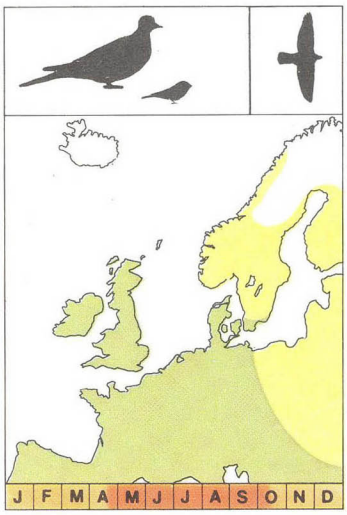
Twin requisites for the Rock Dove's habitat are caves in which to nest and open ground on which to feed. Man's activities have greatly increased the supply of both: buildings are excellent substitutes for caves, and deforestation has enormously enlarged the extent of open ground. Domesticated and Feral Pigeons probably originated from wild Rock Doves which nested in buildings early in European history. Various weed seeds, especially those of vetches, are the bird's natural food, but in cultivated areas grain is a major item.

Rock Doves have exceptionally long wings and swift flight—features which, combined with an excellent homing ability, have led to the development of the domesticated racing pigeon. These characteristics probably owe their evolution in part to the Peregrine Falcon, which occurs in the same habitat as the Rock Dove and preys on it extensively.

Rock Doves nest socially on cave ledges, the male bringing twigs, heather or dry seaweed and the female assembling them. Breeding occurs throughout the year, during which three or four broods may be reared.

Wood Pigeon

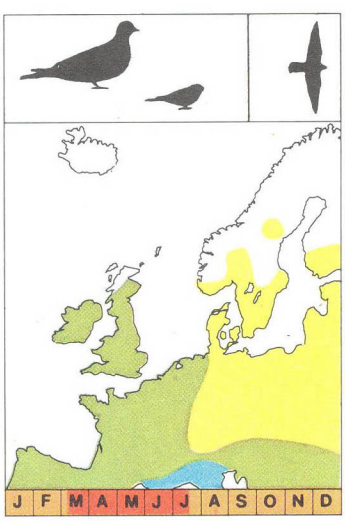




Pigeons are unique among birds in producing a special fluid on which to feed their young. Because it is manufactured in the crop, and analogous to the milk produced by mammals, this fluid is known as crop milk, and it has an important influence on the birds' ecology. Many vegetarian birds are dependent on insect food when young, since this is the only diet providing sufficient protein for rapid growth. Consequently, their breeding seasons are fixed to the period of maximum insect abundance in early summer. Crop milk is a perfect substitute for an insect diet, and it emancipates pigeons from this strict seasonality. Consequently, their breeding seasons are spread over several months, though they may be affected by the availability of other food supplies.

Wood Pigeons show a peak of nesting activity and success in late August and September, when grain on recently harvested stubble gives the adult abundant food from which to make crop milk for the young. At one time, the lean winter months following this period inhibited breeding, but increased planting of clover for cattle fodder has expanded the breeding period by providing an abundant new source of winter food. In severe weather, Wood Pigeons may turn to other crops, such as brassicas or legumes, and their depredations at such times may be severe. This has earned them pest status in farming areas, where everyman's hand seems to be against them.

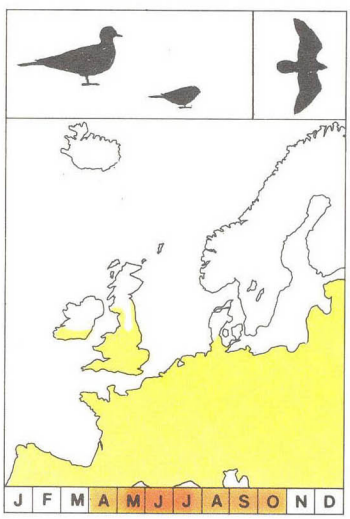
Stock Dove



Parkland, with plenty of old timber, is the haunt of the Stock Dove. Such places provide the tree cavities which this hole-nesting pigeon needs for breeding purposes, though it will also resort to sea cliffs or deserted buildings. Unlike its relatives, however, the Stock Dove shows comparatively little tendency to exploit Man's environment. Although occurring regularly on farmland, and ready to add grain to its usual diet of weed seeds, in parks the bird ignores food which Wood and Feral Pigeons readily consume.

Because of their superficial similarity to Wood and Feral Pigeons, and their lack of distinctive field marks, Stock Doves often escape notice. Their presence can always be detected in the breeding season, however, by the cooing song, with its curious, gulping quality. Dead trees containing nest holes are situated close together in some places—a circumstance which often leads to fierce fighting between neighbouring pairs. The nest itself is often almost non-existent, though sometimes a typical pigeon's platform of sticks is built. Most pigeons depart occasionally from the typical clutch of two eggs, and the Stock Dove seems more prone than most to lay three. Two or three broods are usually reared and incubation lasts 16 to 18 days. The young fledge in about three and a half weeks, but may return to roost in the nest hole. Some northern populations of Stock Doves move south in winter.

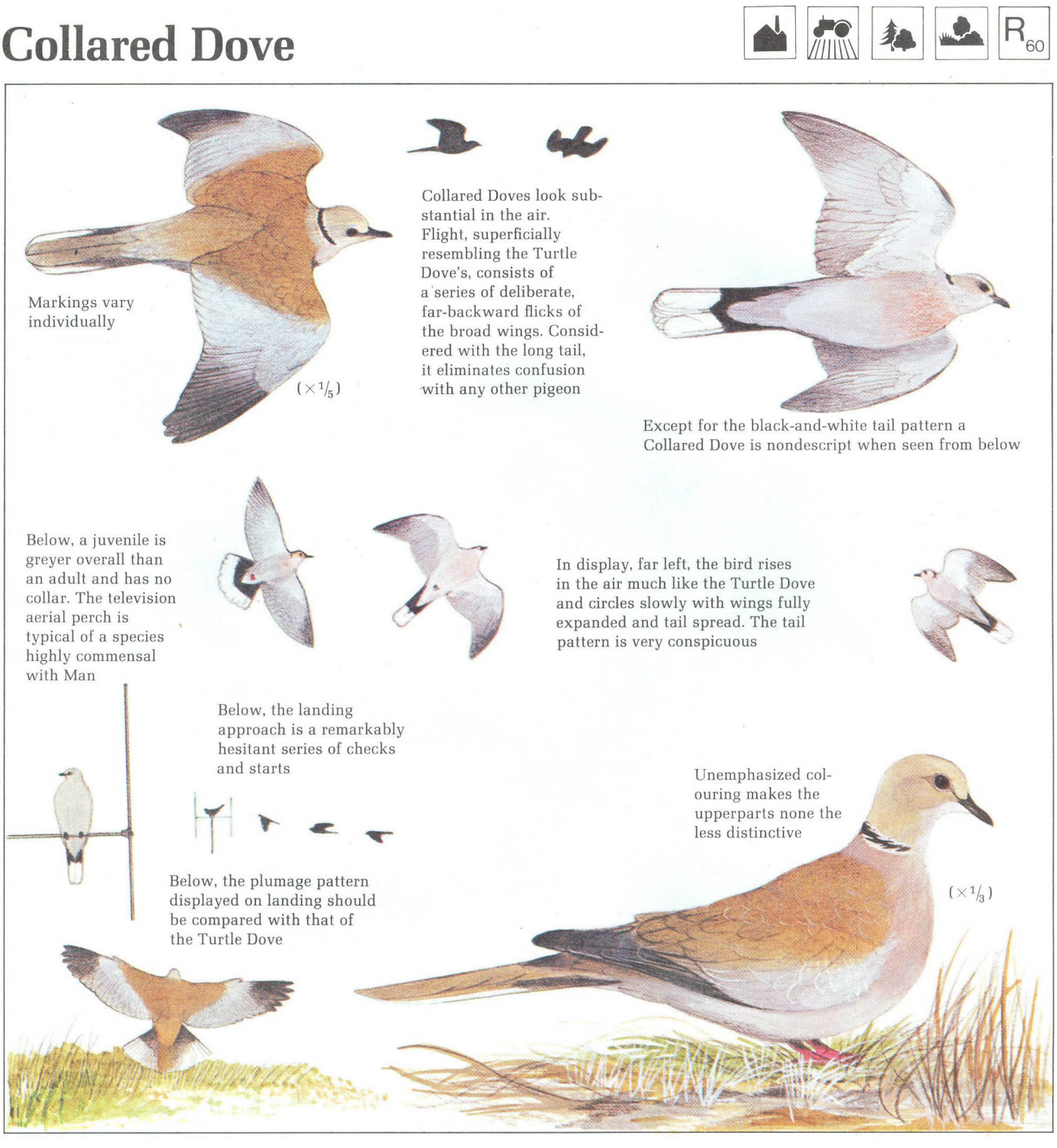
Turtle Dove

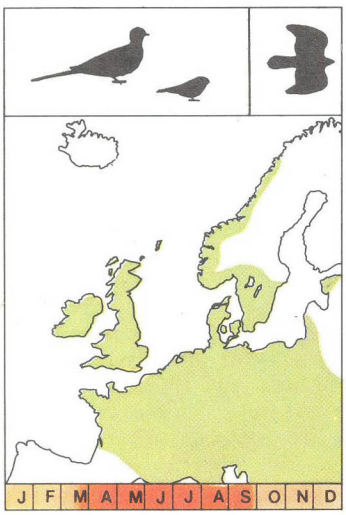


The Turtle Dove's purring song seems to add the final soporific touch to a languid summer's day. Unlike other European pigeons and doves, this species is exclusively a summer visitor, its distribution closely linked with that of fumitory, the plant which is its principal food. Seeds of this and various other herbs make up its diet, and like the Collared Dove, the Turtle Dove will congregate around farm buildings to feed on grain—although the two species are rarely seen in the same farmyard together.

Although the Turtle Dove has the extended breeding season characteristic of pigeons, this has to be cut short in order to moult the flight feathers and build up fuel reserves for migration. Consequently, although conditions are good for breeding during August, many late broods are deserted. Nests are built nearer the ground—sometimes only three feet high—than those of Wood Pigeons and Collared Doves. Hawthorn, brambles or similar dense cover are the location, and the nest itself is frail in the extreme—a simple platform of twigs and rootlets is typical, but one nest on record was made entirely of wire scraps. In common with all pigeons, the male brings material and the female builds the nest. Two eggs are laid, and both adults incubate. After two weeks they hatch, and the young are fed by both parents during the three-week fledging period.

Collared Dove

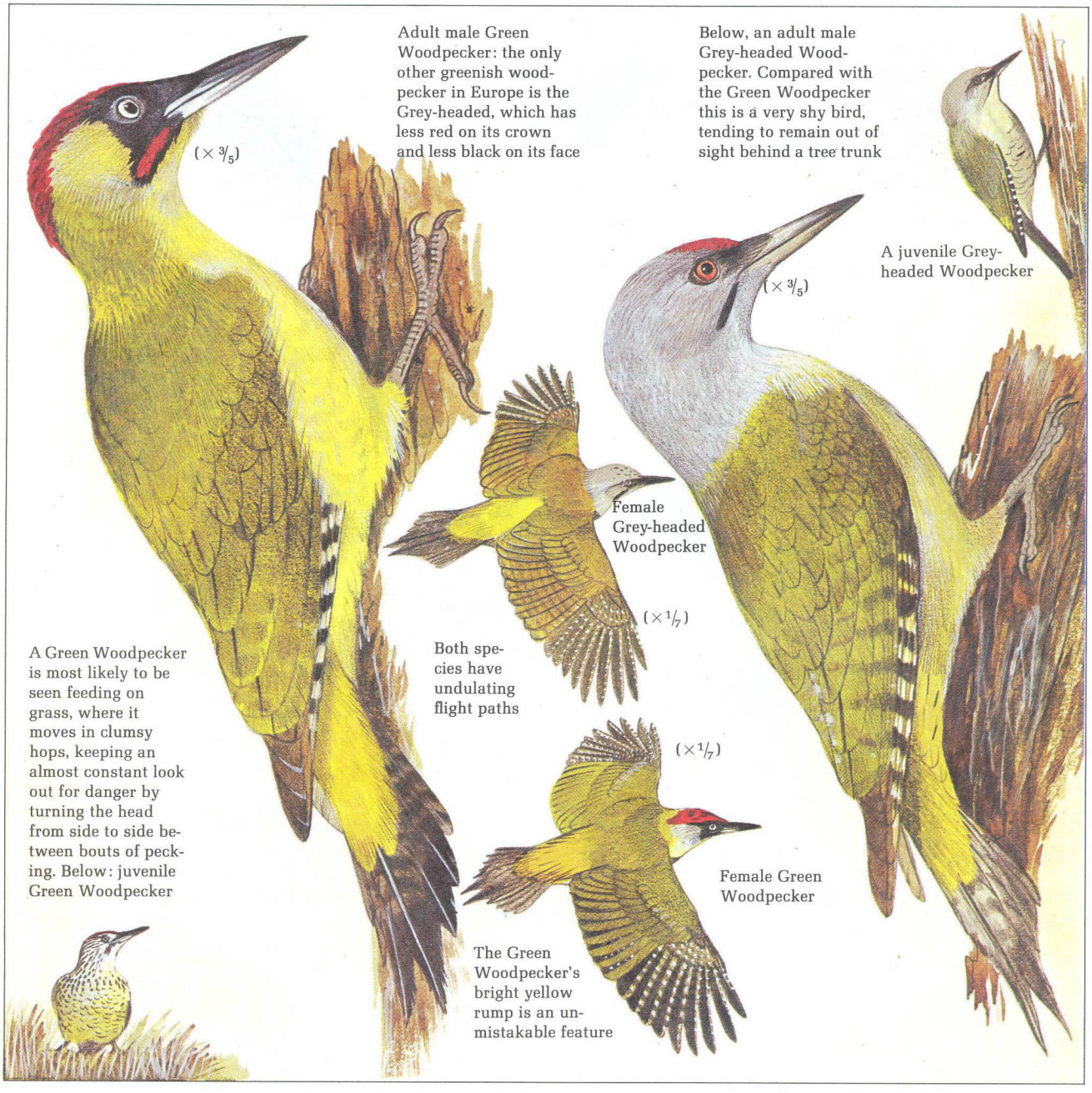


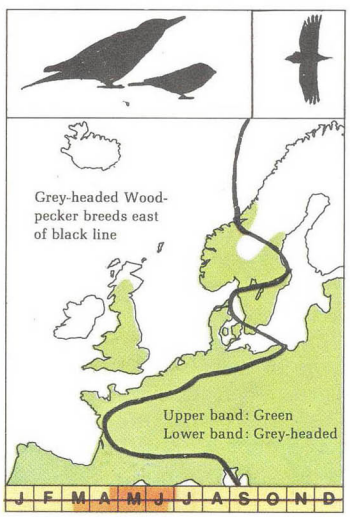


Since about 1930 this species has shown a dramatic expansion of its range, spreading from a foothold in the Balkans to cover most of central and northwestern Europe, including Britain and southern Scandinavia. What triggered it remains uncertain, but it is clear that the species' success is based on close association with Man. It is more timid and wary than Wood or Feral Pigeons, which is surprising in view of the fact that unlike them it is not a severe pest. Suburban gardens with a plentiful scattering of conifers are a favoured habitat, and the birds will also congregate in large numbers near farm buildings when grain is being processed, or on stubble in early autumn.

An additional factor in the Collared Dove's rapid spread must have been its astonishing reproduction rate coupled with low mortality. Pigeons generally have long breeding seasons, but Collared Dove nests can be found in use in any month of the year, even during winter in the north of its range. Four or five, perhaps more, broods may be raised each year, sometimes overlapping, so that a pair may be feeding one brood on crop milk while already incubating the next clutch. The nest is a frail stick platform, usually sited in a conifer. Yews or deciduous trees covered in ivy are also used, and in all such situations the nest can be surprisingly difficult to see, even when a bird is sitting. The dove may reveal its presence by repeatedly flying to the same spot.

Green–Grey-headed Woodpeckers



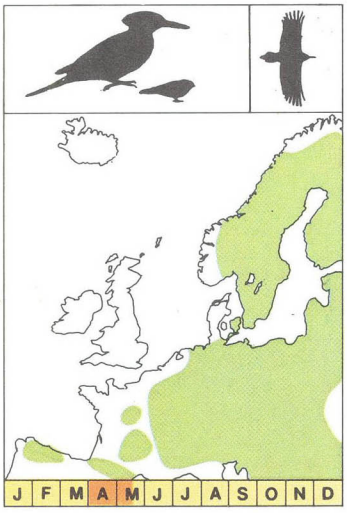


Woodpeckers are known for their long tongues, a valuable adaptation by which the birds can feed on ants by probing the holes and passages of anthills or rotten wood. Green Woodpeckers have longer tongues, and a fondness for ants which brings them to feed on the ground more often than any other member of their family–they frequently visit lawns and playing fields. A mixture of old timber and open ground–typified by parkland–provides a favoured habitat, although almost any deciduous wood may prove suitable. Green Woodpeckers "drum" less than other woodpeckers, but have an extensive vocal repertoire.

Trees chosen for nesting are usually externally sound but rotten inside, and both sexes excavate the nest hole, which has a horizontal entrance tunnel and vertical shaft leading to the chamber itself. Five to seven eggs are laid on the wood chips which cover the floor. Both parents share the task of incubation, which lasts 18 to 19 days, and both feed the young. Many birds are evicted by Starlings.

The Grey-headed Woodpecker is closely related to the Green, and its habits are very similar. Although less widely distributed in Europe, its total range is much wider and it is at present spreading westwards. Habitats chosen include some mountainous terrain which the Green Woodpecker ignores, and the species also shows greater tolerance of coniferous woodland.

Black Woodpecker



Stately plumage of scarlet and black, and large size, make the Black Woodpecker an imposing bird. Its habitat must include tall trees, of which conifers or beech are preferred. From the primary choice of mountain forest, the species has recently extended its range to include lowland areas in central Europe. Ants and other insects are the main food.

Black Woodpeckers, like the rest of their family, are strongly territorial, using "drumming" as a means of advertising territory during spring. This sound, audible for a considerable distance, is produced by a series of extremely rapid blows of the beak against a tree. It should not be confused with the normal feeding or nest-building noises of this and other woodpeckers, in which powerful blows are struck at intervals often several seconds apart. Occasionally, "drumming" is performed inside the nest cavity.

Perfectly healthy trees may be selected as nest sites. The task of excavation is undertaken by both sexes, and few holes are much lower than 20 feet from the ground. The cavity may be up to two feet deep. Four to six eggs are laid—incubation and feeding the young being carried out by both male and female. The eggs hatch after 12 to 14 days, and the young leave at 24 to 28 days. Jackdaws seeking nest holes often evict Black Woodpeckers, which is surprising in view of the latter's size and strength.

Great Spotted Woodpecker

Viewed from behind, the white shoulder-patches are an eyecatching feature

Flight is undulating—a series of rapid wing beats followed by momentary closure of the wings at the bottom of each dip

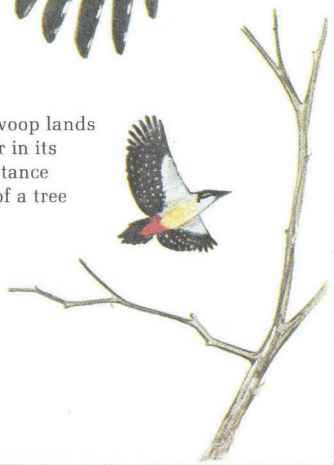
(× 3/10)

An adult male Great Spotted Woodpecker, left, has a conspicuous red patch on the nape. The female has not

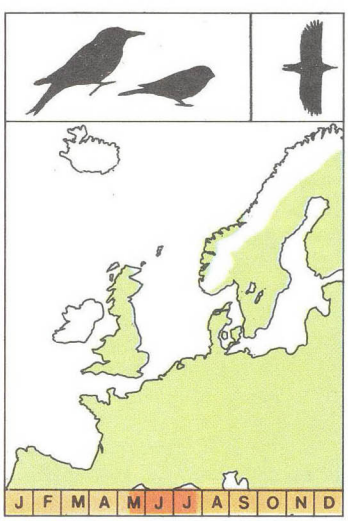
(× 3/5)

The Great Spotted Woodpecker is easily distinguished from the Lesser Spotted Woodpecker either by its white shoulder-patches or by the brilliant red of the under-tail coverts. This is a large, vigorous bird, with quite an aggressive manner and an explosive call which matches its personality. On a tree trunk it hops rather than climbs, working from side to side

An upwards swoop lands the woodpecker in its usual vertical stance on the branch of a tree



A young male shows only a small amoünt of red under his tail, but the red nape-patch is visible



A feeding woodpecker sounds as if it is just tapping: in fact, the bird is hammering at the tree trunk with extreme force. A glimpse of the damage done always raises the question of how the bird's own physique can absorb the punishment of such blows. Study of head anatomy shows that the answer lies mainly in the design of the upper jaw, which normally would transmit the shock of the blows to the braincase. This shock is effectively cushioned by the action of the muscle which raises the upper jaw, and which is highly developed in woodpeckers. The Great Spotted Woodpecker is a highly effective hammerer: it not only exposes the tunnels of wood-boring insects, but also extracts seeds from pine and spruce cones during winter. The cones are wedged into crevices in tree trunks before hammering; oak-galls, containing the larvae of gall-wasps, may be treated in the same way. Bird-lovers who put up nestboxes in woodland may from time to time regret the Great Spotted Woodpecker's efficiency when it hews the boxes open to extract and eat eggs or young. Nevertheless, the bird is welcome at many bird-tables.

The Great Spotted Woodpecker's own nest is most often made in decaying tree trunks, either in deciduous or coniferous woodland. Four to seven eggs are laid, and both parents incubate them for 16 days. About three weeks are required for fledging to be completed.

Lesser Spotted Woodpecker

In spring, the male Lesser Spotted Woodpecker performs a "moth" display flight, floating from tree to tree, wings fully spread. He may also "parachute" from the top of a tree, displaying his upperwing markings to the female above

The Lesser Spotted Woodpecker's flight has the same undulating motion as the Great Spotted Woodpecker's

(× 3/10)

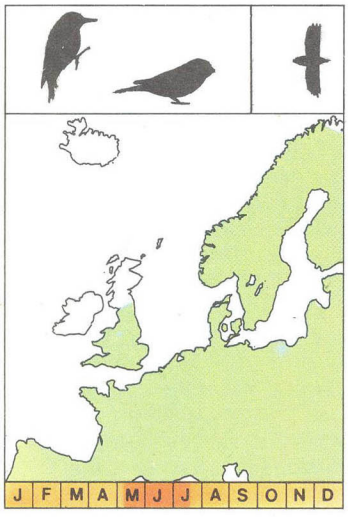
This species can be instantly distinguished from the Great Spotted Woodpecker because it lacks the latter's conspicuous white shoulder-patches

A tiny, sparrow-sized woodpecker, whose markings fully explain the species' former name of Barred Woodpecker. As well as its obvious plumage differences, the Lesser Spotted's head shape contrasts with that of the Great Spotted, and so do the proportions of its beak. Its character has an elf-like quality very different to the aggressive masculinity of the Great Spotted Woodpecker

Below, the female Lesser Spotted Woodpecker has a white crown

(× 3/5)

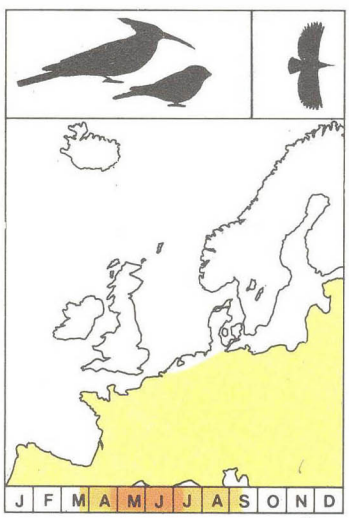
A juvenile lacks any trace of red. The face is dun coloured and the rest of its plumage resembles the adult's



This tiny woodpecker finds its living mainly among the smaller dead twigs and branches of trees, rather than on the main trunks and boughs frequented by its larger relatives. Various types of woodland or parkland suit it, and it frequently occurs in old orchards. Insects make up most of the diet, particularly larvae of wood-boring beetles and wasps. Because it spends much of its time high among the smaller branches of trees, the bird is often overlooked, but the call may betray it—a shrill, repeated note rather like that of the Wryneck. Despite small size, the Lesser Spotted Woodpecker drums loudly and extremely rapidly—the frequency is 14 to 15 blows per second compared with the Great Spotted Woodpecker's eight to ten. In common with several other woodpeckers, a display flight is performed by the male in spring. He may fly from tree to tree with slow flaps, or float down to the female's vicinity on trembling wings.

Nest holes are often in quite narrow branches, frequently on the underside of a sloping limb anywhere between near ground level and 80 feet. Soft decayed wood is usually selected, and with such a small entrance hole the nest can be confused with that of a Willow Tit. Four to six eggs are usually laid, and the two-week incubation is performed by male and female. Both also feed the young; they become extremely noisy once old enough to compete for food at the entrance hole.

Hoopoe

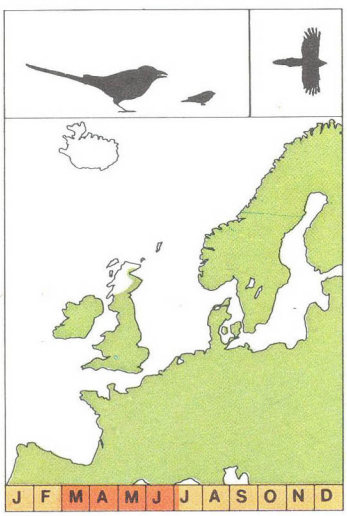


Many birds have been loosely described as unmistakable, but, with its erectile crest, black-and-white-barred wings and long decurved bill, few can deserve the epithet more than the Hoopoe.

The decurved bill gives some clue to the bird's feeding habits. Although some of its prey (including such large creatures as mole crickets and even scorpions) is captured on the surface, the Hoopoe also obtains food by probing. Skull and jaw muscles show adaptations enabling the bill to be opened with considerable force against the resistance of the ground, and it is probably by excavation of this type that the insect larvae which predominate in its diet are found. The call, a far-carrying "oop . . oop . . oop", is uttered normally from the ground, with head lowered and neck distended.

Courtship displays often involve false feeding of the female by the male. Cavities in trees or among rocks are selected as sites for the nest, which usually has no lining. The birds make no attempt at nest sanitation: the combined effect of accumulated droppings and the Hoopoe's own distinctive smell creates a peculiarly unpleasant odour. Five to eight eggs are laid, quickly becoming stained by the mess. The female incubates, fed on the nest by her mate; hatching takes place after 16 to 19 days. At first only the male brings food while the female broods the young, but soon both birds are feeding their offspring.

Magpie



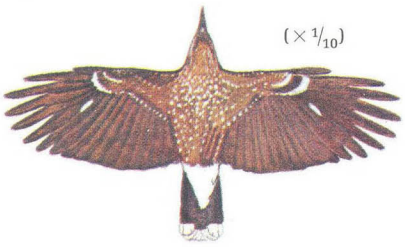
An unmistakable and familiar bird with a flight as distinctive as its plumage – the long tail showing clearly, the short, rounded wings beating a few times between swooping glides. When socially or sexually excited, the Magpie's plumage is fluffed out, showing much white; a frightened bird shifts the emphasis to black by sleeking its feathers down. Always alert to danger, Magpies are happy to be viewed from a moving car, but vanish if it stops.

Magpies are notorious as predators of eggs and young birds. Pairs can often be seen working along hedgerows or woodland edge to the accompanying scolding of smaller birds. Otherwise predominantly ground feeders, and, like most crows, omnivorous, they show inquisitive interest in bright objects – hence the tales of "thieving Magpies".

The nest is built by both sexes and holds four to eight eggs, incubated only by the female, who is fed by her mate. It is impregnable to most predators, but Carrion Crows often attempt raids. In southern Europe, Magpies are parasitized by the Great Spotted Cuckoo.

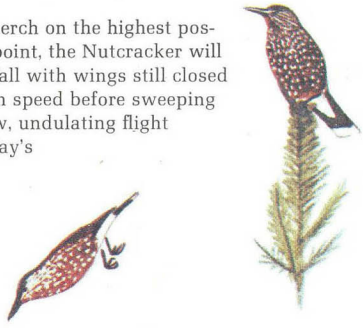
Magpies walk energetically, tail slightly elevated, or hop for extra speed. In winter they can be seen foraging in small groups, though in places there are large communal roosts. In spring, they gather in social assemblies, where unpaired birds can find mates: it is here that individuals can be seen showing off the iridescent wing and tail feathers.

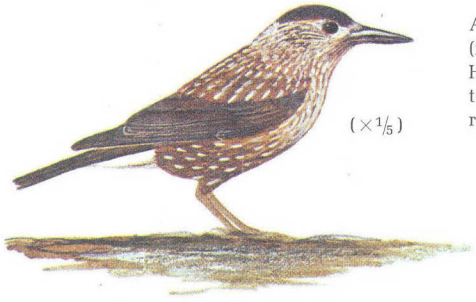
Nutcracker



Seen from below, the Nutcracker has a unique, broad-winged, short-tailed outline. The white triangle of the undertail coverts is very conspicuous, as is the white terminal tail-band

Delighting to perch on the highest possible vantage point, the Nutcracker will leap into free fall with wings still closed in order to gain speed before sweeping off into its slow, undulating flight similar to the Jay's

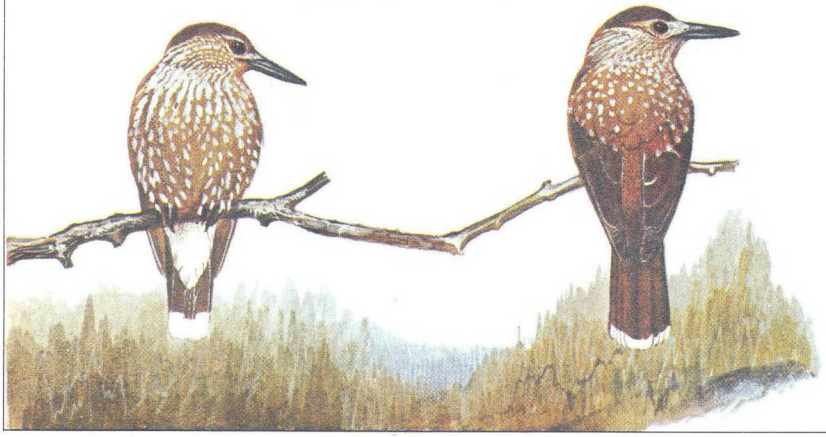




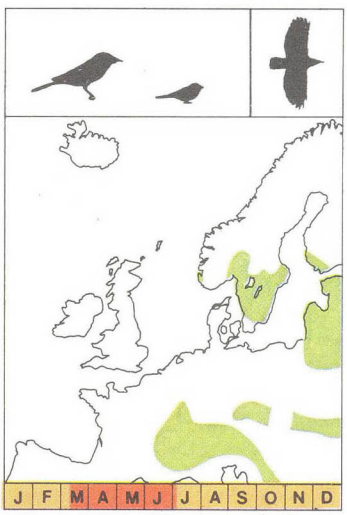
A long "stabber" beak (it can and will be used to kill House Sparrows) contributes to the Nutcracker's general resemblance to a crow

Northerly distribution means that although the Nutcracker breeds in May, there are many years when it is obliged to incubate in a nest piled with snow

Front and back, the Nutcracker's plumage is heavily spotted. The white terminal band is visible on the upper- and on the undertail



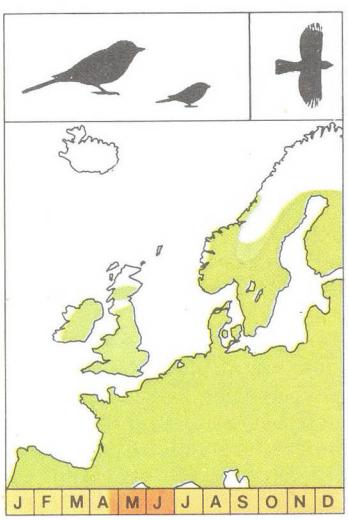
Under the beak there is a food pouch, used in autumn while collecting food for storage



Pine seeds rather than nuts are the principal food of the Nutcracker, which provides an interesting parallel with that other pine cone specialist, the Crossbill. Both species nest early in the year, allowing the young plenty of time before the hardships of winter to gain experience in the highly skilled process of extracting pine seeds. Both have also evolved specialized means of coping with such a difficult food source, but their strategies are different. Crossbills are masters at opening even tightly closed cones with speed and efficiency; because of this, they have no difficulty feeding their young on the food available during their fledging period. Nutcrackers deal with the problem by storing food from the previous season for use during the breeding cycle – a unique habit, because other food-storing birds consume their hoards during winter. To enable them to do this, Nutcrackers have large pouches in the floor of the mouth in which pine seeds can be kept as they are extracted, leaving the bill free to hammer and pry at the cone for more. A final similarity is that Nutcrackers, like Crossbills, show population fluctuations and periodic irruptions linked with the vagaries of the cone crop. Central European have thicker beaks than Scandinavian birds.

The Nutcracker's nest of twigs and earth is placed on a pine tree branch. Three eggs are laid, and incubated by the female for 18 days.

Jay

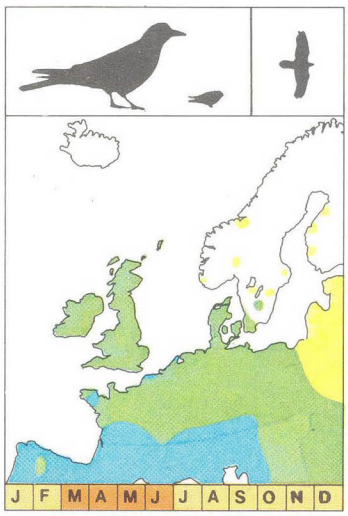


The oak trees which dominate so many European forests are in debt to the Jay, for it expends much effort during autumn in collecting and burying acorns for later consumption. Although the bird shows a remarkable memory for the places where it has buried them, inevitably a few are missed, and new oak trees start life in places they could otherwise never have reached. The burying process is carried out by excavating a hole in the ground with the bill, disgorging the acorn into it and covering it up. Apart from acorns, Jays take a great variety of animal and vegetable food, and their liking for the eggs of other birds sometimes makes them unpopular.

Heard at close quarters the familiar harsh screech of the Jay is almost deafening, but the bird also has a varied repertoire of other calls, and of postures, denoting subtle differences in emotional state. Excited gatherings of up to twenty birds may be seen in spring, with males displaying to females by turning the body sideways, raising crest and body feathers, and revealing the white and chestnut wing patches.

The nest, built of twigs with a lining of roots, is sited in a young tree or bush, not usually higher than 20 feet. The usual clutch is five eggs, which have a surprising similarity to those of the Blackbird in colour and size, although the Jay is not a nest parasite. Incubation is by the female alone.

Rook

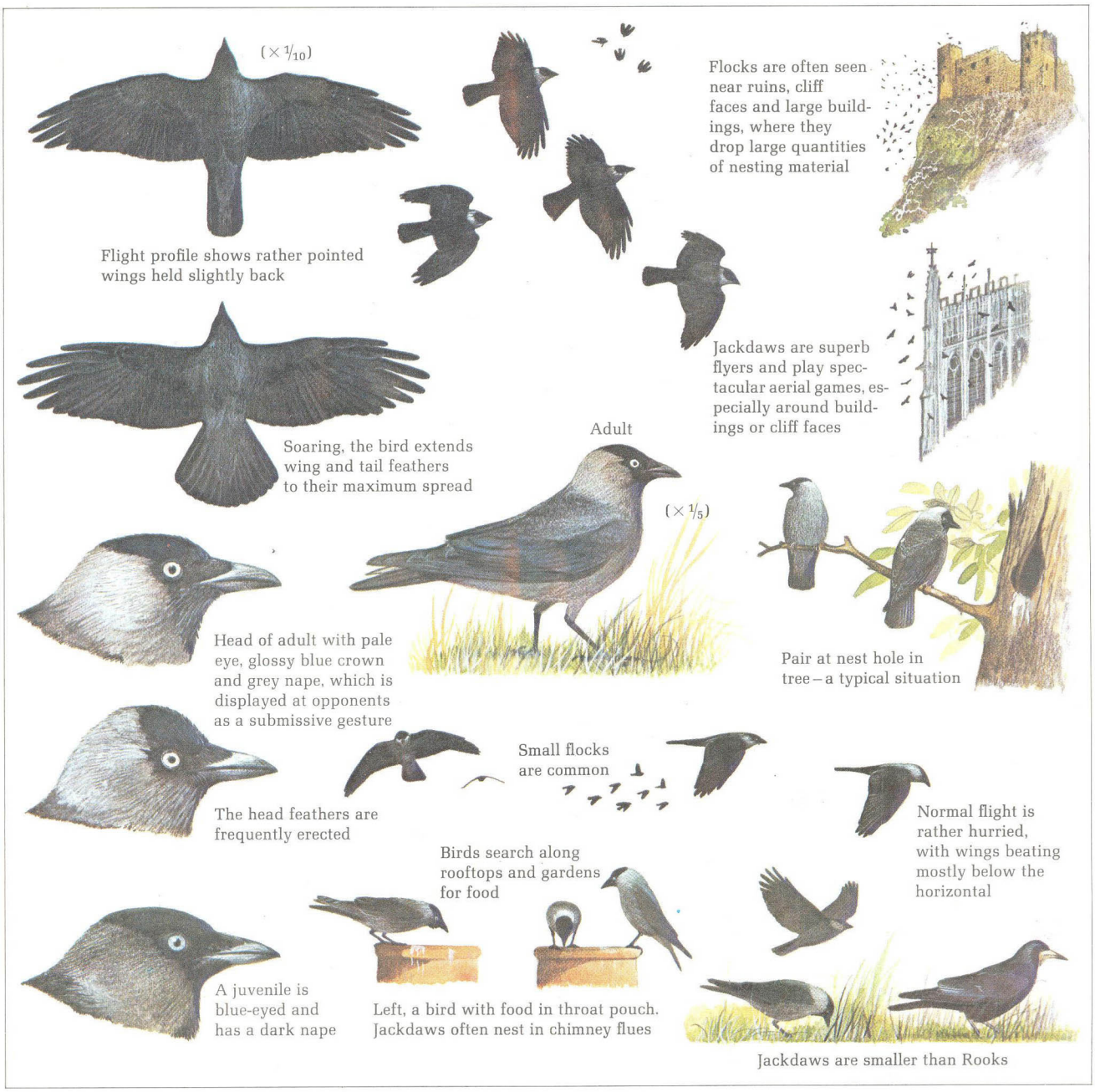


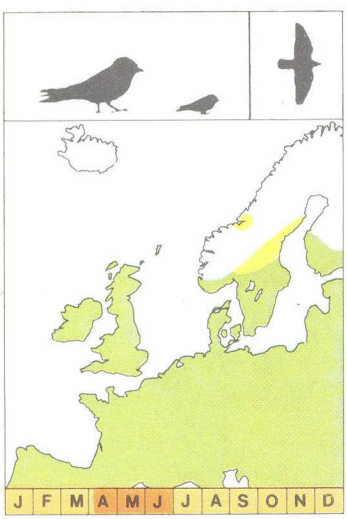
The noise that surrounds a rookery is as much a part of our villages and farmland as the sight of their bulky twig nests grouped in tall trees. Breeding starts in February or March, when the supply of large earthworms is at a maximum. Using binoculars, the display, the inevitable family squabbles and thieving of sticks from neighbours' nests can be easily observed. Most rookeries are from a handful to a hundred or so nests, but in Scotland several hundred, even two thousand nests may occur in a single rookery. During October, Rooks return to the rookeries in a brief resurgence of breeding activity, quickly extinguished by the dwindling number of daylight hours.

The Rook is widespread across central and northern Europe, shunning places where trees are few or absent. Rook numbers in Britain increased between the wars, and a late 1940s survey showed a density of 35 birds per square mile. The latest survey, however, shows a sharp decrease in the population, the cause of which is still being investigated. Rooks are scarce in urban areas, unlike the Carrion Crow, which sometimes nests in the centre of major cities.

Always gregarious, Rooks often feed in mixed flocks with Jackdaws, and in winter the two species assemble in communal roosts. In Britain and France, winter numbers are swelled by migrants from central Europe. Rooks feed on grain and other vegetable matter.

Jackdaw





The Jackdaw is well entrenched in European folklore and literature. Not only does it frequently nest in buildings, but it makes an intelligent and interesting pet, and shares with some other crows a liking for bright objects–hence such tales as the Jackdaw of Reims. Like many species that nest in colonies, it has an elaborate system of communication by postures and calls, and these have been the subject of intensive study, which has revealed that a large proportion of the Jackdaw's social signals are learned, rather than inborn.

Natural nest sites are either cavities in groups of large old trees, or holes in cliffs. Buildings often provide suitable sites, and Jackdaws frequently create a nuisance by blocking chimneys. The nest is a heap of twigs lined with grass and other scraps, and huge amounts of such materials accumulate in traditional sites. Four to six eggs are laid, paler in colour than those of other crows–an adaptation to the dim light of the nest cavity.

Both sexes bring food, carried in the throat, though at first this task is performed mainly by the female. The fledging period is 30 to 35 days. Jackdaws have the same omnivorous diet as other crows, and are often seen foraging on rubbish tips. Outside the breeding season, they frequently flock with Rooks, their clucking calls standing out clearly from the harsh caws of their larger relatives.

Raven

R

Out of breeding season, groups may gather to soar, wheel and perform aerobatics

(×1/10)

Soaring profile shows slightly drooping wings

Overhead, Ravens can be reliably identified by their massive size, "fingered" wings, heavy head and especially the wedge-shaped tail

Ravens have more pointed wings than crows, and this is especially evident when they are soaring. Relatively, their heads also project farther forwards

Profile of travelling flight, in which the wingbeat is strong and purposeful

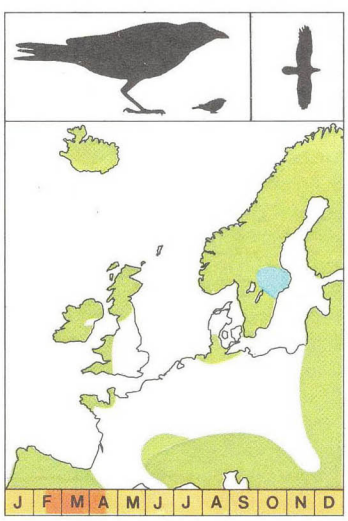
Ravens are masters at using the upcurrents around their cliff nesting sites for superb aerobatic displays

The sedate walk, a typical ground posture. Note the powerful feet

(×1/5)

A heavy head, massive beak and bristling throat feathers, giving the bearded look, all set the Raven apart at close quarters

Drooping wing attitude, far right, often adopted when the bird is hopping



Impressive and sinister in its usual setting of crags and mountains, intelligent and amusing in captivity, the Raven figures prominently in history and folklore. The deep guttural call enhances its aura of menace and instantly confirms visual identification. Carrion bulks large in its diet, and Norse sagas record Ravens in attendance at battles of the Viking era: huge gatherings can still be seen at whale strandings. Other food includes small mammals, such as frogs, eggs, insects and vegetable matter.

Nesting is early. Building may commence in mid-winter in England, and the clutch of four to six is laid in February. Deep blue-green with brown freckles, the eggs closely resemble those of the Rook and Carrion Crow. The young are fed by both parents, at first with insects, but soon with pieces of meat. The food is often moistened, and a captive breeding female is recorded cooling her young by wetting her underparts before brooding. They fledge at five to six weeks.

Amenability to captivity has permitted detailed studies of the Raven's behaviour. Signals used in courtship and threat involve ruffling the neck feathers, stretching, bowing and holding wings out from the body, but actions are less stereotyped than in many birds, conveying a wider, more subtle range of information. An extensive sound vocabulary is also used. Ravens are gregarious where common, and often form large communal roosts.

Carrion Crow–Hooded Crow

In flight, Carrion Crows can be confused with Rooks, but the tail is square-ended, the flight slower, the wings show a squarer profile and the head does not project so far forward. The grey body of the Hooded Crow is completely distinctive. Rooks usually occur in flocks, crows in ones or twos

(× 1/10)

Both birds have identical outlines

Carrion Crow

(× 1/10)

Like all other crows the Hooded and Carrion carry their feet forward

Hooded Crow

A male proclaims his territory

Slow, flapping display flight, high in the air

These birds are, of course, carrion eaters

Nests are usually situated to give open views in all directions, Carrion Crows normally in isolated or tall trees, Hooded Crows in trees or on crags. Male crows proclaim their territory from several conspicuous trees or rocks

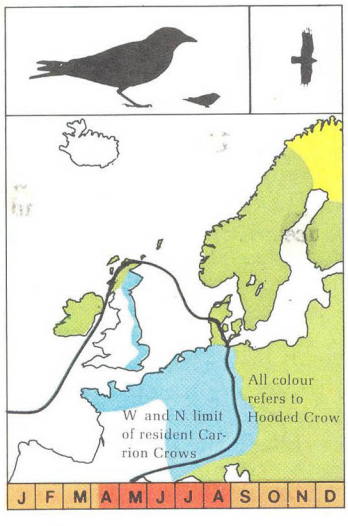
Crow gliding flight–wings held forward

Above, the glide before landing

(× 1/5)

(× 1/5)

On the ground crows walk or hop with equal ease. The feathered portion of the legs is sleekly groomed compared with the Rook's "shaggy trousers"



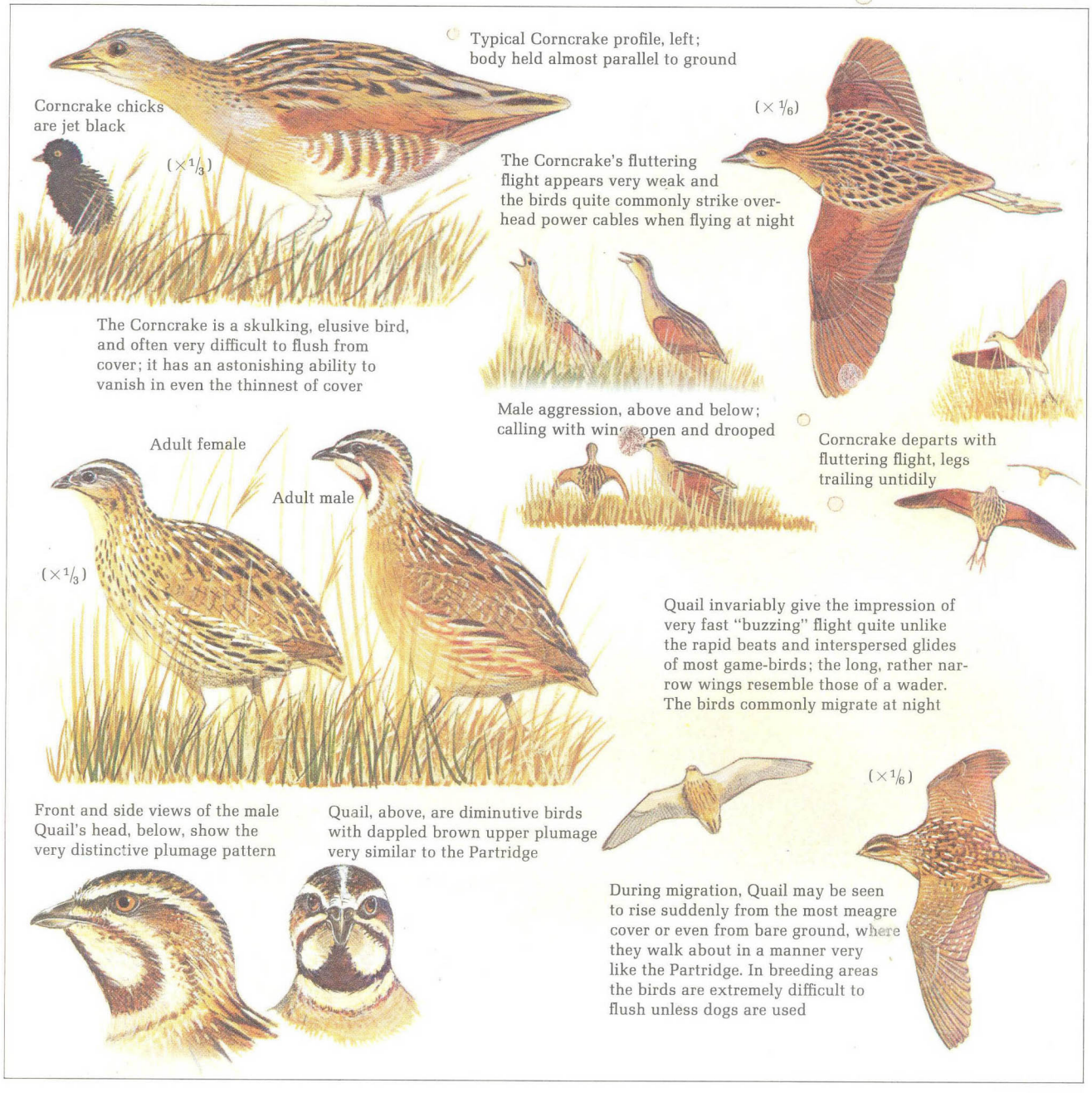
Crows are usually solitary or operate in pairs – the birds often co-operating to steal food from other predators – even taking fish from Herons. One bird will hop quickly about in front of the Heron, distracting its attention, while the other attempts to sneak the fish from behind.

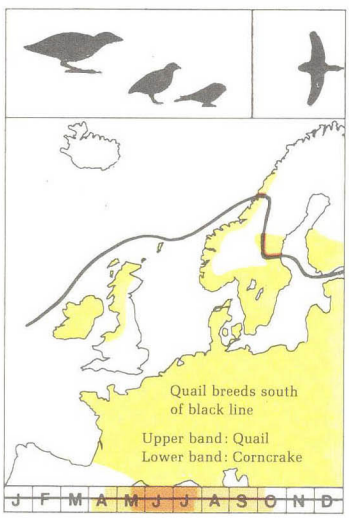
The diet resembles the Rook's, including earthworms, ground insects and grain, but in spring and summer especially, eggs, young birds and small mammals. Preying on game-birds has earned crows an evil reputation with gamekeepers. Shooting and poisoning have failed to control their numbers, and while other predators have declined, Britain's crow population has increased in recent years. Crows have successfully invaded urban areas, perhaps aided by an ability to scavenge on rubbish tips and open spaces.

Less dependent on earthworms to feed their young than the Rook, crows breed about two weeks later. The solitary nest resembles the Rook's, but is often placed much lower, sometimes on the ground. Three or four eggs are laid.

Most crows are resident, but many Hooded Crows from the North move south in winter, occasionally reaching eastern England. The Hooded Crow occurs in Ireland, northern Scotland, Scandinavia and eastern Europe. The Carrion Crow is the bird of lowland Britain and southern and central Europe; hybrids occur in a narrow zone of overlap.

Corncrake—Quail



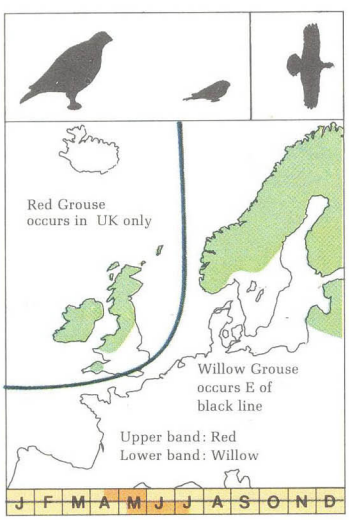


Astonishing dexterity at slipping through cover on foot frustrates most attempts to observe the Quail. Nevertheless, its call of "wet-my-lips" is still familiar in many parts of Europe, and immediately recognizable among the bird imitations in Beethoven's Pastoral Symphony.

In its winter quarters, this migratory game-bird occurs in sufficient numbers to rank as a major sporting target, while the Far Eastern race, domesticated in Japan, has achieved the doubtful distinction of use as a laboratory animal. The nest is exceptionally difficult to find, and probably many breeding occurrences go unrecorded; it is simply a scrape with a sparse lining amongst grass, cereal or vegetable crops, in which are laid seven to 12 eggs. Incubation by the female lasts 16 to 21 days and the young can fly by their nineteenth day.

The Corncrake—a rail—is not related to the Quail, but the two have much in common: they are skulking, meadow birds, known best by their calls, and gravely reduced in numbers by modern mowing methods. Breeding Corncrakes announce their presence by a rasping call, such as might be produced by dragging a stick across a comb. Their nests are made in sheltered hollows in clumps of grass or other plants, lined with grass stems. Eight to 12 eggs are laid, and the female incubates them for 14 to 21 days. Young Corncrakes are fully fledged at seven or eight weeks.

Red Grouse—Willow Grouse



Red Grouse and Willow Grouse belong to the same species, and are found in northern latitudes of the Old and New Worlds. Britain and Ireland are the home of the two races known as Red Grouse, which are distinguished by uniform red-brown coloration in summer and winter. All other races are known as Willow Grouse, and have white wings in summer and almost completely white plumage in winter.

Because grouse shooting in Britain is a highly organized sport, these birds have been intensively studied. Red Grouse feed mainly on young heather shoots, of which grouse-moor owners ensure a constant supply by regular burning. Willow Grouse live in a more natural environment, where they feed principally on birch and willow buds and to a small extent on heather.

Both Red and Willow Grouse are monogamous. Males stake territories in early autumn by means of display flights and much loud crowing. Pairs remain together until they have reared their young the following summer. Cocks which fail to gain territories, and most hens which fail to find a mate, wander into poorer habitats during the winter and die. Weakened by starvation, these birds often show a heavy infestation by internal parasites, which were once thought to cause the deaths. It is now understood that such birds are a doomed surplus, and that habitat condition is the main factor controlling the size of the population.

Black Grouse

R

In flight, the male Black Grouse is an impressive bird, its glossy black plumage set off by huge white wing-bars. The enormous lyre-shaped tail is quite unlike that of any other British bird

Usually seen in its open moorland habitat, the Black Grouse has the typical flight of a game-bird–rapid beats on stiffly held wings interspersed with long glides. The Black Grouse generally flies higher, and glides more, than the Red Grouse

Black Grouse commonly circle immediately after take-off and also before landing

Male

Female

(×1/7)

Male

Birds are often flushed from cover along woodland margins, particularly those at the edge of marsh or moorland. Plantation forest has extended the bird's range

The female is commonly known as a greyhen–a misnomer as her plumage is richly marked reddish-brown with two pale wing-bars. The male is also widely called the blackcock, and in some areas both male and female are called black game

Grouse often perch on trees, walls or fences

Female

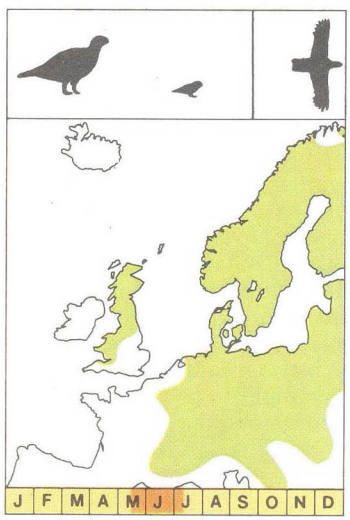
Both male and female display their striking white under-wing pattern when rising. The female should be compared with the similar Red Grouse

The male grouse has one of the most spectacular of courtship displays. Seen from behind, the tail is raised and spread–lyre tips almost touching the ground–while the under-tail coverts show as a great billowing white patch. The wings are drooped low and the red combs are expanded

Rear view of the displaying male

Greyhen at lek

Wings drooped, combs expanded

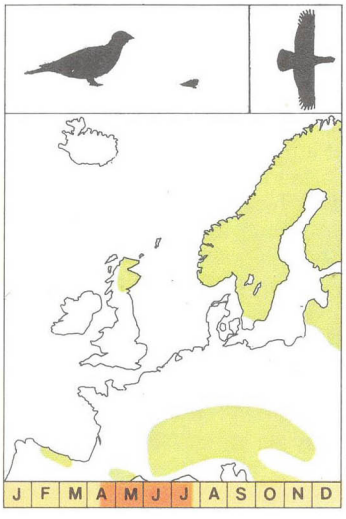


Black Grouse differ sharply from Red and Willow Grouse in their social arrangements. Like the Capercaillie and several North American grouse, they have abandoned the pairing system in favour of one in which males and females meet only for the purpose of mating, and the tasks of incubating eggs and rearing the young are carried out by the females alone.

Courtship and mating take place at a communal display ground called a lek, maintained over a long period. On it, up to 20 males defend small territories against their rivals by means of an impressive threat display accompanied by extraordinary noises–crowing, hissing and a bubbling call which can be heard two miles away. Performances like this are mainly confined to the early hours of the morning, and occur throughout much of the year. Central positions in the lek are held by older birds, and these dominant individuals achieve greatest success in mating with the dull-coloured hens who visit in small parties during spring. Although the hens make many visits to the lek, most will only mate once, and shortly after commence their domestic duties.

Black Grouse inhabit moorland areas, particularly near the edges of forests or cultivation. The nest is a simple scrape amongst rushes, heather or other thick vegetation. Six to ten eggs are laid, incubation lasts 24 to 29 days, and the young can fly well before they are fully grown.

Capercaillie

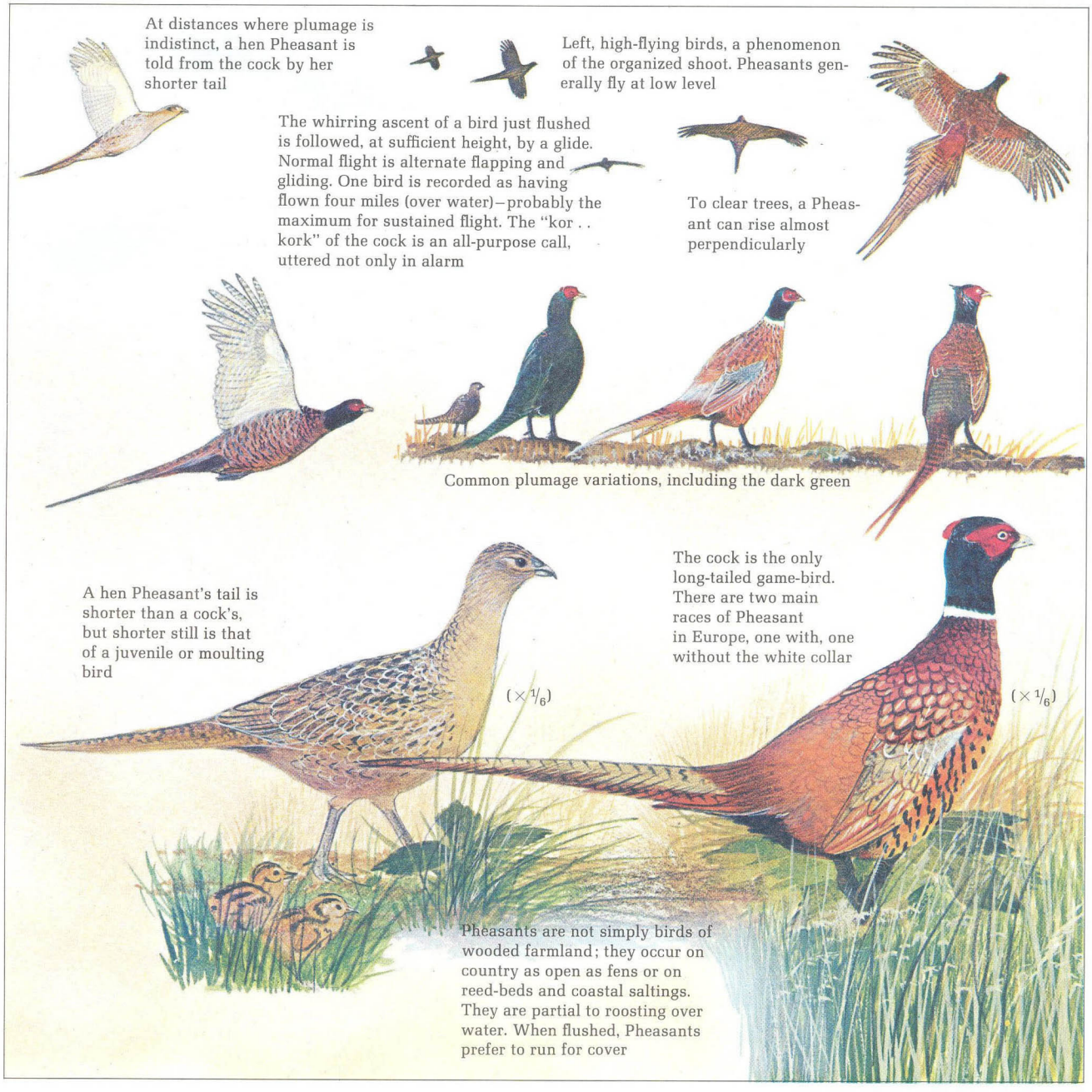


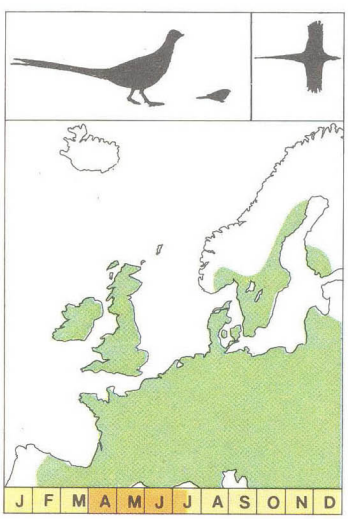
Capercaillies share with a few other large birds the ability to successfully intimidate human beings. Displaying males intent on defending their territory are occasionally aggressive enough to threaten intruders of any size, and have even been known to attack a moving vehicle, with fatal results for themselves. Spread tail and inflated throat feathers give the birds an impressive appearance, and their antics are accompanied by bizarre vocalizations–a succession of clopping noises like a horse, ending with a loud pop and a wheeze.

Exclusively birds of coniferous forests, Capercaillies are found in Scandinavia, central Europe and the Pyrenees. They were exterminated in Scotland by a combination of forest clearance and hunting during the eighteenth century, but birds from Sweden were reintroduced in 1837 and on several subsequent occasions in the nineteenth century. These now flourish, existing, as everywhere, on their unusual diet of pine shoots. This is an almost exclusive diet, and lends their flesh a resinous tang–which has not prevented them from being regularly hunted in many parts of their range.

Female Capercaillies are beautifully camouflaged to match the forest floor on which they nest. Although the nests are solitary, several may be situated in the vicinity of the male's display ground. Young Capercaillies can flutter short distances when about three weeks old, long before they are fully grown.

Pheasant



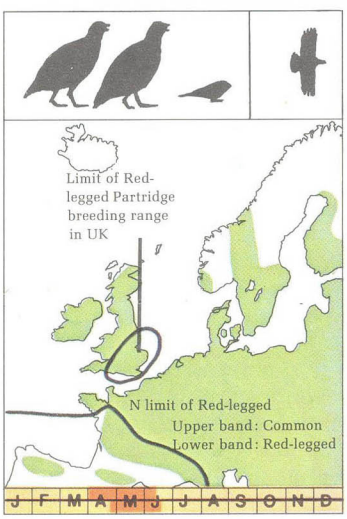


Pheasants are unnerving–even to country people–when they explode under the feet with a whirr of wings and a loud crowing. Like most other game-birds, they are capable of rapid acceleration in the air, and can climb steeply to clear trees or bushes, but they lack the stamina for sustained flight. Muscles with this capacity for a high but short-lived rate of work happen to be good eating: and the sporting challenge provided by such a fast-moving target has of course made this family the shooter's ultimate bird.

Introductions of Pheasants to western Europe started early. Their origins are east of Europe, but with human aid they spread through the Continent and reached Britain during Roman times. During the present century, Pheasants have been established in North America and New Zealand.

In spring, Pheasants like to eat young shoots of grass and cereals, but during the summer change to a diet of grain and other seeds, supplemented by some animal food. In winter, berries, acorns and beech mast are important items. Although many Pheasants are reared in captivity in order to boost natural stocks, they breed freely in suitable wild areas. Nests are scrapes with a scanty lining of vegetation and a few feathers, placed amongst undergrowth in a copse or wood edge. The young can fly weakly after two weeks, but thousands are killed by cars in the first two months of life.

Partridge—Red-legged Partridge

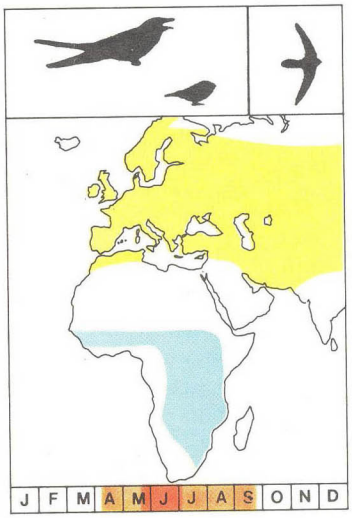


Most Common Partridges inhabit farmland, but the species also occurs on heaths and commons. For nesting, they require hedgerows between fields which modern farming methods have tended to eliminate, with an adverse effect on their numbers. Even where conditions are ideal, Common Partridge populations fluctuate considerably and a cold, wet summer causes high mortality among young birds.

Red-legged Partridges show a wider habitat tolerance, but generally occur in more open areas than the Common Partridge and need more space. They have been introduced for sporting purposes into various regions, notably Britain, where they have thrived. Red-legs fly less readily than Common and, rather than take to the air, family parties or "coveys" are more likely to disperse into cover when disturbed.

Both species site their nests on the ground, usually well concealed under a hedge or bramble-bush. Red-legged Partridges usually lay two clutches in separate nests, one of which will be incubated by the male, the other by the female. Sometimes they leave the first clutch apparently abandoned for some weeks before continuing incubation, and the habit can have strange consequences, such as Pheasants or Common Partridges adding their eggs to the unattended nest. Common Partridges raise only one brood a year. Both species produce clutches of up to 20 eggs; chicks fly feebly at three weeks.

Cuckoo

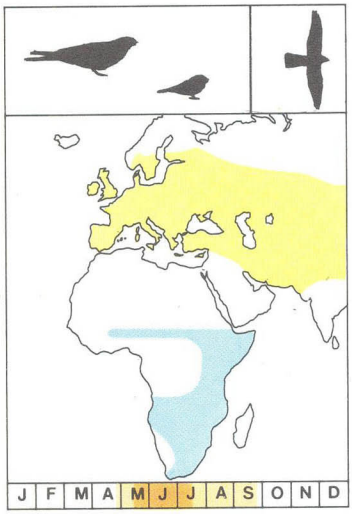


Not everyone welcomes the Cuckoo's call as a symbol of spring: parasitic nesting habits arouse mixed feelings. A wide variety of small birds are exploited, but among the most frequent are Dunnocks, Meadow Pipits and Reed Warblers. A female Cuckoo usually keeps to the same host species, probably the one by whom she was herself reared, and her eggs often–but by no means always–show a strong resemblance to those of the host. Cuckoo eggs are larger than those laid by most of the host species, but are still remarkably small for this size of bird.

The female goes about selecting a nest soon after dawn, choosing one in which the clutch is incomplete and incubation has not yet begun. She keeps watch near by until ready to lay, which is usually in the early afternoon of the same day. Approaching the nest itself is accomplished by gliding down as unobtrusively as possible, preferably during the host bird's temporary absence, but Cuckoos are often attacked by angry parents. The whereabouts of parasitized nests can sometimes be detected by spotting a Cuckoo's feather amongst nearby vegetation.

Because a Cuckoo's egg has the surprisingly short incubation period of $12\frac{1}{2}$ days, it usually hatches when the host nest contains only eggs or very small young. The nestling Cuckoo fledges after the fosterers have spent three weeks of frantic effort satisfying its voracious appetite.

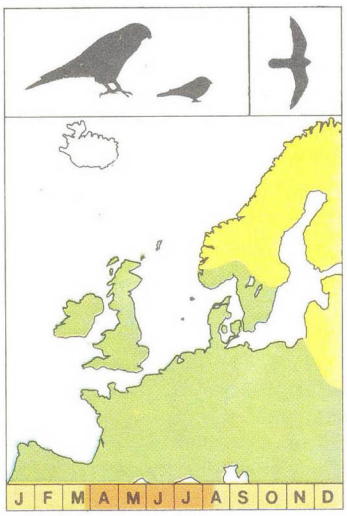
Nightjar



Night-flying insects are a rich potential food source almost entirely unexploited by birds. When darkness falls, it is the bats (with their highly refined system of echo location) which reap the benefit. Just one group of birds has evolved to bridge this gap, the nightjars–strange birds, with huge mouths and intricate camouflage resembling that of the moths on which they largely feed. Only one species of nightjar occurs in most parts of Europe, and it is a summer visitor to dry, open heaths, woodland clearings and young plantations.

From dusk, when the birds are most active, their presence may be revealed by the extraordinary song of the male–a prolonged, dry trill sounding like some piece of machinery and changing pitch periodically. He may also perform wing clapping during the breeding season, and both sexes have gliding aerial displays. No nest is made: the clutch of two eggs is laid on a bare patch of ground, among bracken or heather. The female is relieved at intervals by the male during the 18-day incubation and if disturbed reacts by feigning injury. Both parents feed the young, which fledge after two and a half weeks, but remain with their parents for a further four weeks. Two broods are often reared, the male taking sole charge of the young while his mate incubates the next clutch. Nightjars are decreasing in numbers, particularly in Britain.

Kestrel



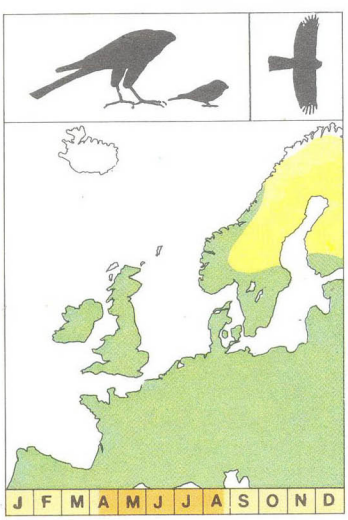
Pointed wings are the most obvious characteristic of falcons, which with hawks comprise the two main families of day birds of prey. The Kestrel is the commonest falcon in Europe; others included in this book are the Hobby, Peregrine and Merlin. Besides structural features, various habits and behaviour patterns distinguish the falcons from hawks: they make no nests of their own; they moult their flight feathers in a different sequence, and they let their droppings fall straight below the perch, rather than projecting them away from it.

In all these ways the Kestrel is a typical falcon, but its feeding and hunting habits are unusual. The diet is largely small rodents, varied with insects, frogs and a few small birds, and to search out most of its prey the bird employs an ideal method—hovering above open ground.

Nest sites are varied, including the abandoned nests of Crows or pigeons, or cavities in dead trees. Kestrels now breed in urban areas, where crevices in buildings furnish nesting places, and House Sparrows largely replace mice and voles as the staple food. Specially designed nestboxes attract them.

Four or five eggs are laid and both sexes incubate them for about four weeks. The young are fed by both sexes, and like all day birds of prey develop two successive coats of down before fledging, which takes place at 28 to 30 days.

Sparrowhawk

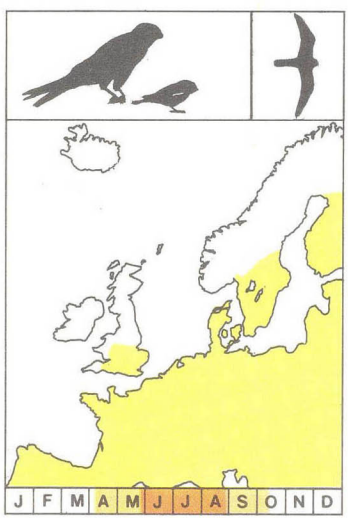


Swift yet manoeuvrable in flight, the Sparrowhawk is the supreme predator of small woodland birds. When hunting, it surprises them by flying fast and low along a hedge or woodland edge. Tenacious to the point of recklessness, Sparrowhawks sometimes pursue prey amongst buildings, and are not infrequently killed by flying into windows. A recent study in Holland shows that the smaller males concentrate on sparrows, finches and tits, while females capture more thrushes and Starlings. Prey is eaten at a regular plucking post, often at ground level, which may sometimes be an old nest or a specially constructed plucking platform.

Soaring display flights may reveal a breeding locality, but once nesting has commenced, Sparrowhawks efface themselves with great skill. The nest is a flat heap of birch or larch twigs sited on a branch near the trunk of a tree at a height of 30 feet or more. Small amounts of down are studded round the edges, more being added as incubation proceeds. Three to six eggs are laid, and the female incubates, leaving only briefly to eat food brought by the male.

Although usually high, the breeding rate has been reduced during recent decades. There have been occurrences of thin-shelled, fragile eggs and deaths of embryos during development, strongly linked with the use of organochlorine insecticides, which also caused a major mortality of adults in Britain between 1958 and 1960.

Hobby

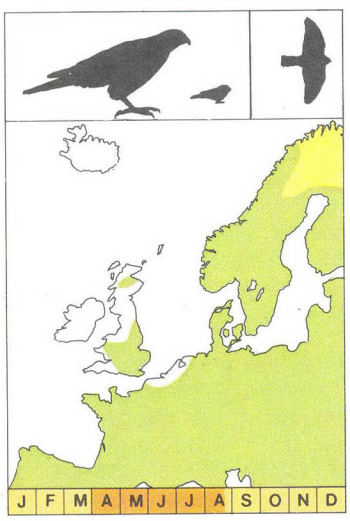


The Hobby is a paragon among European birds of prey—superbly skilled in flight and handsome in appearance. Although its numbers have decreased, the decline has been less marked than among many raptors; in Britain there may even have been a slight recovery of numbers since the Second World War, probably due to stronger protection measures.

Hobbies breed later than many birds of prey, timing the emergence of their young to the period of maximum abundance of flying insects, for these are an important component in the diet of young Hobbies. Adults feed largely on small birds captured in flight, even such aerial experts as Swifts and Swallows. Insects taken include dragonflies, which are also no mean test of aerobatic technique. Heaths, downs or other open country with isolated clumps of trees are the typical habitat.

Displays take place early in the breeding season and include, appropriately enough, spectacular aerial performances, with one bird stooping at another or pairs exchanging food in flight. The clutch of three eggs is laid in the disused nest of another bird, often a Crow, less often a Magpie, Sparrowhawk or Wood Pigeon. Nests used earlier in the same season seem to be preferred to those from previous years, and there is a tendency to choose sites in conifers, though deciduous trees are often used. Young Hobbies fledge in about 30 days.

Goshawk

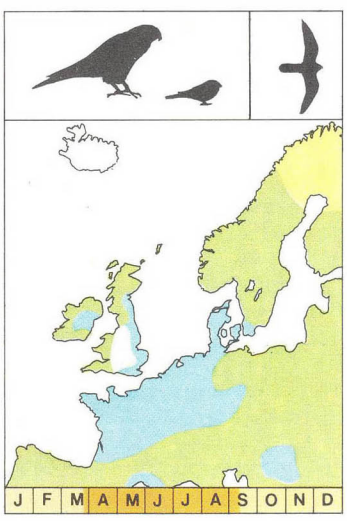


This superb raptor is in many respects a larger, more powerful version of the Sparrowhawk. Forests of all kinds are its habitat, and it stays more strictly within wooded terrain than its smaller relative. Hunting techniques include low-level flights similar to Sparrowhawks', and also short dashes made from some look-out post. Unfortunately, game-birds sometimes appear in the Goshawk's diet, and it has consequently been much persecuted by those concerned with game preservation.

In fact, its normal diet consists mainly of other birds, including many pigeons and Jays—species which themselves are considered pests. A recent study in Holland revealed differences in prey selection by males and females, the former capturing more Jays, thrushes and Feral Pigeons, while females take more Wood Pigeons. Rabbits are also a common prey, taken mainly by females in winter, though male Goshawks capture many of the young rabbits available during the breeding season, when the female is busy incubating. Close relationship does not prevent the Goshawk occasionally killing a Sparrowhawk.

Goshawk nests are larger and more substantial than those of Sparrowhawks, and often include green conifer sprays in their structure. Old nests are often refurbished by the female; new nests are built mainly by the male. Both parents bring food, but direct feeding of the young is by the female only.

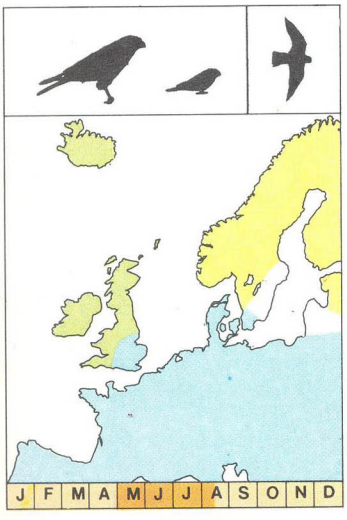
Peregrine



These are the ultimate birds of prey, their renown deriving from a mastery of the stoop. This breathtakingly spectacular plunge to strike at flying victims has prompted some wild estimates of speed, ranging from 120 to 275 mph. A recent careful study using cinematography shows that the falcon levels out and slows up slightly just before striking, and final impact speed may be as little as 40 mph. Lethal damage is inflicted by the claw of the hind toe with the leg partially flexed. The victim is often allowed to fall to the ground. It is a method entirely different – and more elegant to watch – than that used by hawks, which strike from level flight with legs extended, killing with the front toes, and usually binding to the victim. A Peregrine may rise repeatedly above an elusive target – using a series of stoops until successful.

Rock and Feral Pigeons are favoured prey, and during the Second World War this obliged the British Air Ministry to order the destruction of Peregrines, fearing loss of carrier pigeons with vital messages. Though exterminated in southern Britain, they recovered only to face a far worse menace throughout their range – that of pesticides. Regular consumption of birds which have eaten contaminated seeds or insects allows some of those substances to accumulate in the Peregrine's tissue, causing sterility or death. Banning of certain chemicals has permitted a partial recovery, but the situation remains grave.

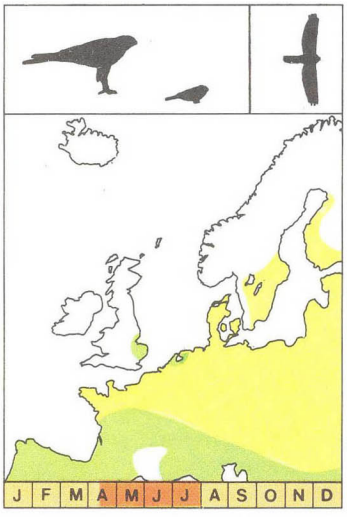
Merlin



Smallest of the European falcons, the Merlin is none the less a fierce and dashing predator, living mainly on small birds, but occasionally taking species larger than itself, including Lapwings, Teal and Ptarmigan. Prey are captured in level flight, without the spectacular stoops of the Peregrine, but with remarkable speed and manoeuvrability. Common victims during summer are such birds as Meadow Pipits, Twites and Ring Ouzels, with which it shares its moorland habitat. During the winter Merlins occur on open country, especially around the coast.

Males arrive first at the breeding area, and before pairing make frequent short flights from perch to perch, calling. Nests are made on the ground amongst heather, or in old Crows' nests. Five or six eggs are laid at two-day intervals, and as incubation (about four weeks) begins before completion of the clutch, the young hatch at two-day intervals with the result that the eldest may be much larger than the youngest. This is usual among birds of prey, including owls, and is thought to be an adaptation to fluctuating food supplies: in lean years the youngest may die, but some of the brood will survive, whereas in an equally aged brood all would probably perish. Female Merlins perform most of the incubation, but both parents are extremely aggressive towards intruders. Food for the young is brought by the male and later by the female as well.

Marsh Harrier

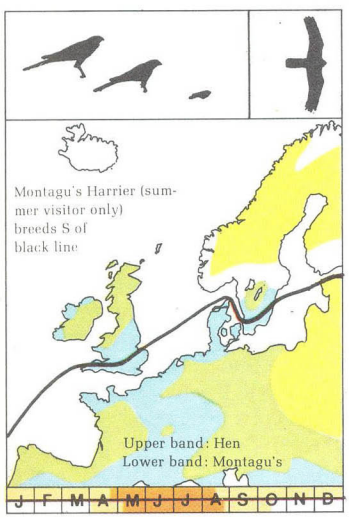


There is a tendency to think of birds of prey as swift fliers, swooping on their victims at great speed. Some certainly are, but for certain types of hunting an ability to fly slowly is more valuable. Harriers are the masters of this technique, able to achieve air speeds of less than 20 mph. Flying into the wind, this may mean a ground speed of 10 mph or less, and brief hovers often intersperse their wheeling, buoyant progress. Minute inspection of the ground is possible at these slow speeds, and efficiency in detecting prey is further enhanced by keen hearing. The characteristic facial ruff of harriers conceals large ear openings, like those of owls.

Marsh Harriers typically frequent reed-beds or swamps of various kinds and will be seen flying rather faster and less buoyantly than Hen or Montagu's Harriers. Frogs comprise much of their diet, but small mammals, reptiles, insects and eggs and nestlings of marsh birds are also taken. A mass of reeds and willow twigs lined with grass forms the nest, usually sited in a reed-bed. Several nests may be close together. Incubation of the four or five eggs is performed by the female, and lasts about 36 days. Young are fed by the female, though the male brings food; they leave the nest before they can fly, at 35 to 40 days. Some males are polygamous.

Southern European Marsh Harriers are apparently more migratory than those which inhabit the north.

Hen Harrier–Montagu's Harrier

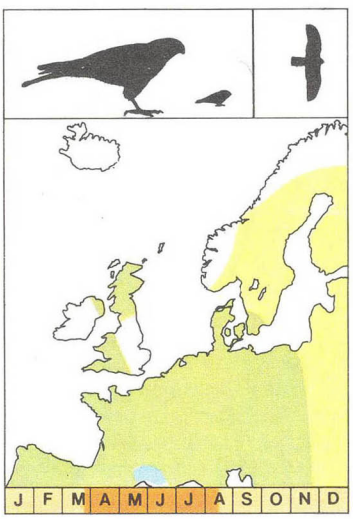


Hen and Montagu's Harriers are similar in both habits and appearance, but the former shows more tolerance of exposed and bleak surroundings. Its breeding range extends farther north, and northern Africa is the southern limit of migration for its western populations, many of which winter within Europe. Moorland is the Hen Harrier's breeding habitat, though marshes, heaths and even cornfields may be used. Montagu's Harrier has a more limited breeding distribution, but winters far south in Africa. Marshes, heaths, rough ground and young conifer plantations provide breeding places.

Both species may quarter the same favoured foraging area repeatedly on successive days. Their food includes various small mammals, reptiles and birds, usually taken by surprise on the ground, though Hen Harriers, which have been estimated to spend 40 per cent of the day airborne, sometimes pursue birds in flight, and have snatched wounded game-birds from under the noses of gundogs. Montagu's Harrier shows a particular fondness for adders. Both birds, but especially Montagu's Harrier, have the habit of roosting communally on the ground.

The whereabouts of breeding areas are revealed in spring by the climbing and diving display flights of the males–of which the Hen Harrier's is particularly spectacular. Both species make similar nests–pads of plant material of varying thickness placed on the ground.

Buzzard

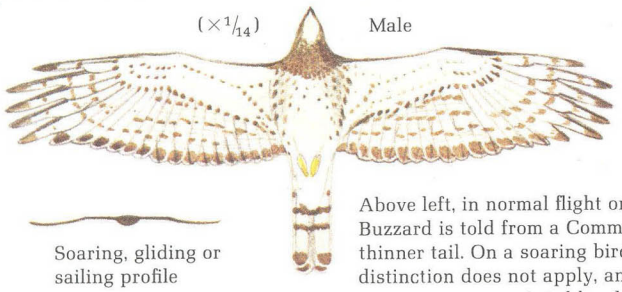


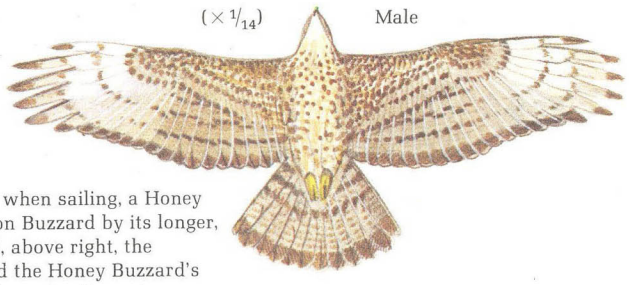
Compared with many European birds of prey, the Buzzard is a thriving species. Persecution by game preservationists has severely reduced many of its populations, but where this pressure has been relaxed, as in parts of Britain, they have recovered quickly. Rabbits are an important item of diet in many areas, and their decrease following myxomatosis led to greatly reduced breeding success in some Buzzard populations. Small mammals of other species, ground birds and reptiles make up the rest of the diet. Where prey is abundant, as on some Welsh islands, Buzzard territories may average as little as 120 acres per pair. The usual requirement is nearer 500 acres.

Buzzards prefer terrain consisting of a patchwork of wooded areas and open ground. The nest, made of sticks, heather, seaweed and often a few bones and sprigs of green foliage, is sited in a tree or on a cliff ledge between 15 and 60 feet up. Two or three eggs are laid, and incubation, by both sexes, lasts 33 to 35 days; fledging takes 40 to 45 days. On dispersal young Buzzards remain near their breeding ground. They probably first breed in their second summer, but before then three-quarters die, usually by shooting. The Buzzard's prospects improve after reaching maturity, and many are long-lived: one German bird reached nearly 24 years of age.

Scandinavian birds of all ages migrate to mainland Europe.

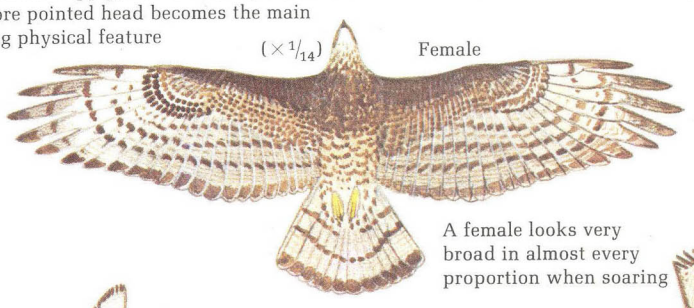
Honey Buzzard





Soaring, gliding or sailing profile

Above left, in normal flight or when sailing, a Honey Buzzard is told from a Common Buzzard by its longer, thinner tail. On a soaring bird, above right, the distinction does not apply, and the Honey Buzzard's narrower, more pointed head becomes the main distinguishing physical feature



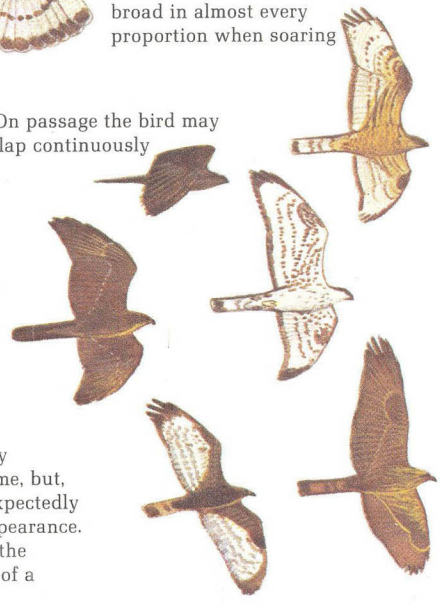
A female looks very broad in almost every proportion when soaring

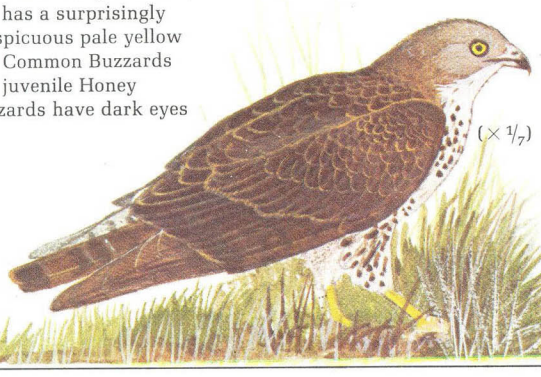
Unless observed on a dark-phase bird, the pattern formed by banding on each of the tail feathers is a conspicuous and certain point of identification

An adult Honey Buzzard, top, has a surprisingly conspicuous pale yellow eye. Common Buzzards and juvenile Honey Buzzards have dark eyes

Honey Buzzards show less rounded tails than Common Buzzards when soaring

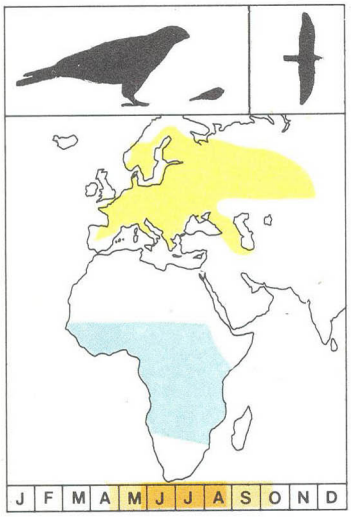
On passage the bird may flap continuously





Close-up, the Honey Buzzard is handsome, but, for a predator, unexpectedly unaggressive in appearance. On the ground are the excavated remains of a wasps' nest

Above, Honey Buzzards on passage. Although the pattern of barring does not basically alter, colour is variable in the extreme and misleading to the point of confusion with another species

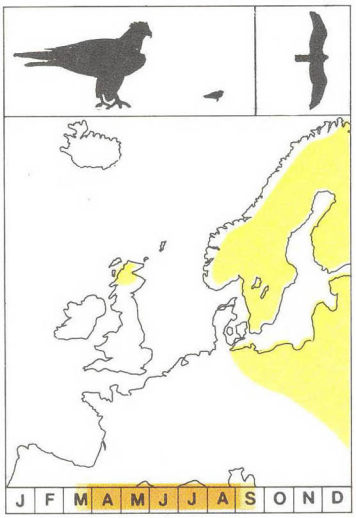


Bees, wasps and their larvae seem strange food for a bird of prey, yet they are the Honey Buzzard's staple diet. Although this is varied with some small mammals and reptiles, adequate provision for a pair of Honey Buzzards requires a territory of some four square miles. Deciduous woodland, especially beech, is preferred, and some clearings are necessary for foraging. Adult wasps and bees have their stings bitten off before they are swallowed, but it is the grubs and pupae in nests of these insects which are the main objectives. Ground nests are dug out with the feet, while wasps' nests on buildings may be torn off in flight.

For their size, Honey Buzzards build rather small nests, but often on the foundation of a disused Crow or buzzard nest. Green sprays of beech are used liberally in its edges and lining. One to three eggs are laid, and are incubated for 30 to 35 days; fledging takes 40 to 44 days. The parents share duties equally, and either sex may brood or feed small young. At first, their food is brought largely in the form of wasps' nests and honeycombs carried in the parents' crops; these are regurgitated and larvae are picked out for the nestlings. Later, small vertebrates are also brought to the nest.

On migration, southward-bound birds, often in spectacular numbers, follow such well-defined routes as those over southern Sweden, the Bosporus and Gibraltar.

Osprey



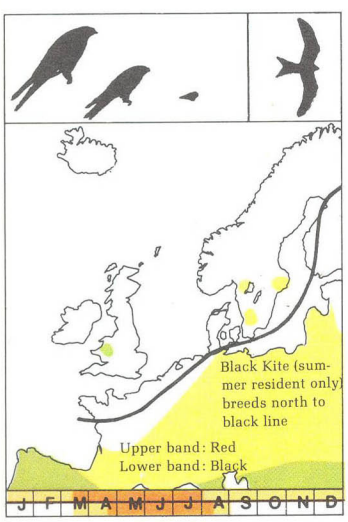
Several birds of prey have turned to fish as a source of food, but by far the most successful and efficient of these is the Osprey. Its anatomy reveals that it diverged early from the main line of raptor evolution, and it is classified in a family of its own.

When fishing, it circles at between 50 to 100 feet, hovering briefly when it sights prey before plunging feet first. Fish of up to four pounds in weight are regularly captured, but accounts of Ospreys dragged under and drowned by larger fish should be viewed with scepticism.

Ospreys have a very wide distribution, including all continents except Antarctica. Sadly, their populations in Europe and North America have dwindled seriously, due to direct persecution and more recently to the effects of toxic chemicals released into waterways. Under strict protection their status has improved in some places, notably in Britain, but even these birds may be shot on migration.

Pines and spruces with dead branches high up the trunk are typical nest sites. Reused year after year, the nest of sticks, heather and grasses grows to a large size. Three eggs are normally laid and the 35-day incubation is undertaken largely by the female, though the male shares up to 30 per cent of the task during daylight. The female remains with her young while the male feeds the whole family a total of about three to five small fish a day.

Black Kite–Red Kite

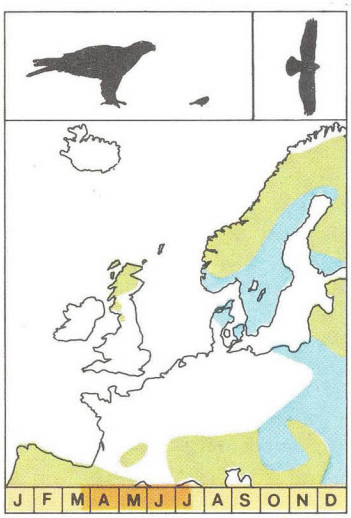


Closely related but with different temperaments, this pair of species provides an illuminating case study of interaction between man and birds. Black Kites are bold and opportunist; although they have declined in parts of Europe, they are generally still common and have increased in some places. Red Kites are more beautiful, and also more timid: they have declined seriously during the past two centuries, becoming extinct as breeding birds in Denmark, Norway, Belgium and Austria, and reduced to a remnant in several other countries, including Britain.

Black Kites supplement a basic diet of small vertebrates and large insects with carrion and edible rubbish. Urban areas provide superb opportunities for exploiting the latter source, and Black Kites teem in many towns and cities in the warmer parts of the world. Their boldness is illustrated by numerous instances of birds snatching food from market stalls, even from people's hands, sometimes causing injury. Red Kites once took garbage in the streets of London, and still do in the Cape Verde Islands, but have never fully exploited refuse as a source of food. Deciduous woods bordering open country are now their main habitat.

Both species are tree nesters, building large structures of sticks and earth. That of the Red Kite is rather flat-topped and lined with grass or wool; the Black Kite's is deeper, and usually has rags in the lining.

Golden Eagle



Traditional status as king among birds has not prevented the Golden Eagle from being mercilessly harried by gamekeepers, shepherds and egg collectors. More recently, its populations have been further imperilled by reduced fertility, and abnormal fragility of egg shells caused by organo-chlorine insecticides accumulated in the bodies of its prey. Perhaps its air of majesty may retain sufficient hold in people's minds to improve its prospects of survival.

Largest of the prey normally taken are hares or foxes, for anything bigger needs to be dismembered or partly consumed before being carried away. However, there is a recent record of an eagle killing a red deer calf, and eagles have been trained by Mongolian falconers to fly at wolves. Although lambs are occasionally taken, many are probably picked up dead, and the habit scarcely justifies the war waged on the bird by some sheep farmers.

Mountainous regions are the Golden Eagle's habitat, and its nest is usually placed on a cliff or in a tree. Made from sticks, heather and bracken lined with grass and rushes, the nest is used year after year, and successive additions of material can make it up to ten feet across and five feet deep. Two eggs are usually laid with a three- or four-day interval between. Incubation starts with the first, so that the eaglets differ in age. In 80 per cent of broods, the elder eventually kills the younger.

Tawny Owl

A bow-winged attitude is a characteristic of the Tawny Owl's swift and agile flight. Wing beats are interspersed with glides as the bird turns and twists through the trees

For long-distance flight, the owl has fairly rapid wing beats and the flight path is undulating. The bird is best seen in the very early morning, at daybreak

The perching bird has a plump, rounded look

An adult Tawny Owl at the nest with a month-old chick. The bird's head is very rounded, almost disproportionally large with huge, dark, liquid eyes. The tail is long but, owing to the breadth of the wings, appears to be of only moderate length

($\times 1/3$)

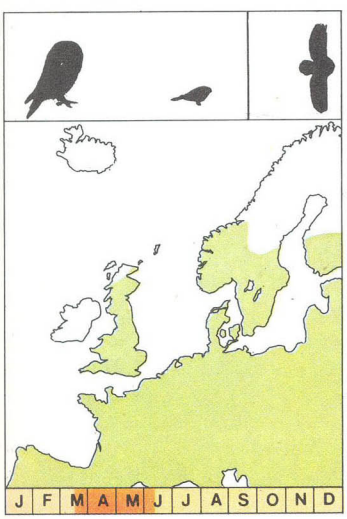
In flight, right, the short, rounded wings and large head are unmistakable

The Tawny Owl has rich brown mottled plumage with fairly conspicuous white spots visible on the scapulars

($\times 1/6$)

Face and beak of the Tawny Owl, right, should be compared with those of the Barn Owl, which has an exceptionally long beak for an owl

Left, the grey phase continental owl



Over much of Europe this is the most common and familiar owl, its hooting call the archetype of all owl voices–though in fact rather unrepresentative.

The appeal of owls lies in their humanoid expressions, with large foreheads and eyes set at the front of a broad, flat face. Such features are actually adaptations for nocturnal hunting–the position of the eyes confers a wide field of binocular vision, important for accurate judgement of distance, while their size is a consequence of specializations for enhancing night vision. Sensitive hearing is also vital, and owls have relatively huge ears, their openings concealed just behind the facial disc of feathers surrounding the eyes.

Tawny Owls' ecology and life history have been very thoroughly investigated. They start nesting early in March, laying their clutch of two to five eggs on debris at the bottom of the nest hole. Incubation is by the female, starting with the first egg; 28 to 30 days are required for each egg to hatch, after which the male brings food–typically small rodents or shrews, occasionally small birds. Young fledge after five weeks, and the number successfully reared is strongly related to food supply. Young owls are dependent on their parents for some three months after leaving the nest, but then have to fend for themselves. Autumn and winter are times of high mortality, particularly for immature birds.

Little Owl–Scops Owl

(× 1/3)

Scops Owl, above, often perches on roofs: a vague form seen at dusk. In Mediterranean towns its persistent and monotonous call is often a nuisance

The extreme slimness of its form, the very noticeable ear-tufts and the finely vermiculated plumage instantly identify Scops Owl, left, from the dumpy figure of the Little Owl.
It is a tiny, stern-looking owl: flight is swift and wavering with no trace of the bounding motion characteristic of its relative

Scops Owl

(× 1/6)

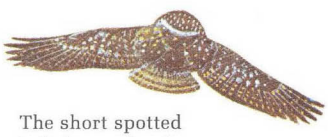
Little Owl

(× 1/6)

Above, the squat form of the Little Owl may often be seen perching on telegraph poles

Right, Little Owl's under-side is heavily barred

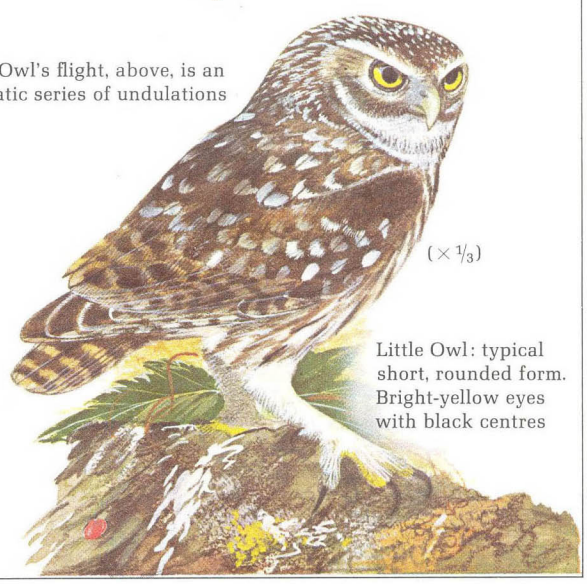
Little Owl's flight, above, is an emphatic series of undulations



The short spotted tail shows clearly on a departing bird

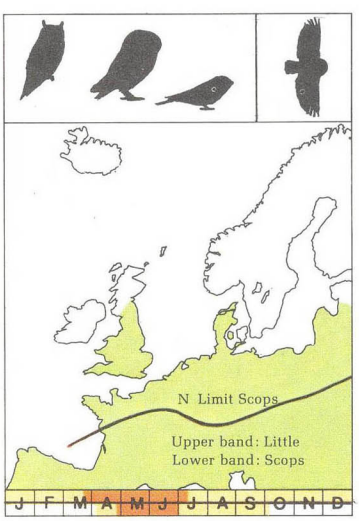
Agitated bobbing, a common sight

An adult Little Owl peers from its tree nest hole. Characteristically more open faced than Scops Owl



(× 1/3)

Little Owl: typical short, rounded form. Bright-yellow eyes with black centres

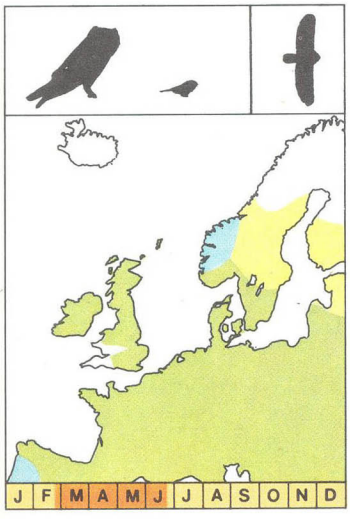


Widely distributed in Europe, the Little Owl was introduced into Britain during the late nineteenth century and has successfully colonized most of England and Wales, although some decrease has recently occurred. One of the more diurnal owls, this species may often be seen on a telegraph wire or similar prominent perch, or flying overhead–when its undulating progress might for a moment confuse it with a woodpecker until the head shape is noticed. Little Owls have a mewing call, and during the breeding season members of a pair utter this alternately in a duet.

Hunting is carried out mainly at dawn or dusk. Insects, especially dor-beetles and cockchafers, are frequent prey, as are mice and slugs. Because of its capacities as a pest-destroyer, the Little Owl is popular with gardeners in some parts of Europe, but in many places small birds are its principal prey.

Little Owls normally nest in hollow trees, quite often near the ground; pollarded willows are a favourite. Eaves under the corners of old barns may also be used, and, wherever situated, the cavity usually has at least two exits. Three to five eggs are laid, and although incubation usually starts with the first egg, the female may not begin incubation until the clutch is complete. Hatching occurs after 24 to 25 days and the fledging period is three and a half weeks. Both sexes feed the young, and continue to do so for some time after they leave the nest.

Long-eared Owl

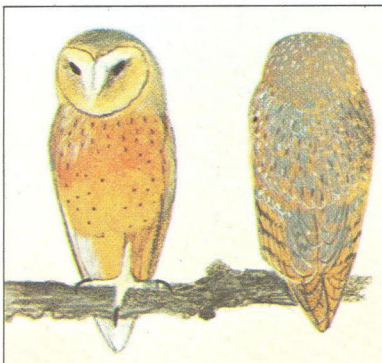


The wise old owl of countless children's tales is usually depicted as a Long-eared Owl. This character's origins are in Greek mythology, where, however, the archetype, which lacks ear tufts, seems more like a Little Owl.

Strictly nocturnal, except in the extreme north of its range, the Long-eared Owl is a difficult bird to glimpse, concealing itself very effectively while roosting—even though groups of up to 20 may sometimes do so together. Long-eared Owls generally prefer conifer habitats, but are by no means confined to them. Prey varies greatly with locality. In some places many birds are taken at roosts, and pairs of Long-eared Owls have been seen to hunt co-operatively, one flushing out victims while the other pounces. Small rodents are of prime importance in most areas, their cyclical population changes affecting the breeding success of the owls. In good years, more pairs nest, more eggs are laid and more young are produced. Disused nests of such birds as Crows and pigeons provide the usual site in which the clutch of three to eight eggs is laid, but sometimes eggs are placed on the ground under bushes or branches. Incubation, probably by both sexes, takes 27 to 28 days; both parents feed the young, which fledge in three and a half weeks.

Long-eared Owls tend to shun the vicinity of human habitation, and have not adapted to man-made environments as successfully as the Tawny Owl.

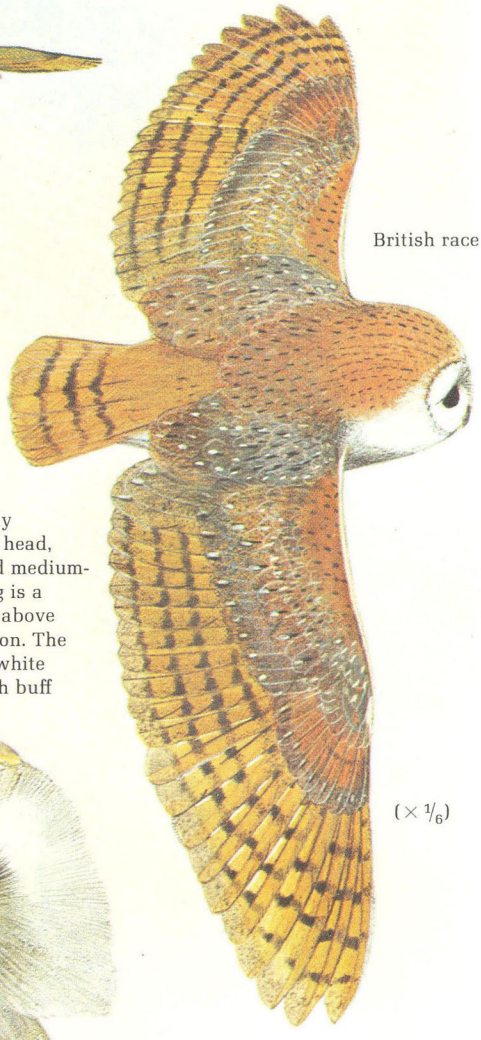
Barn Owl



Continental race, above; darker breast and extensively vermiculated plumage

Right, when flying at dusk, the Barn Owl is seen as a ghostly, elusive form—its flight slow, buoyant and wavering. The Barn Owl tends to patrol at greater height than the Short-eared Owl: it is commonly seen in daylight, especially when feeding young

British race



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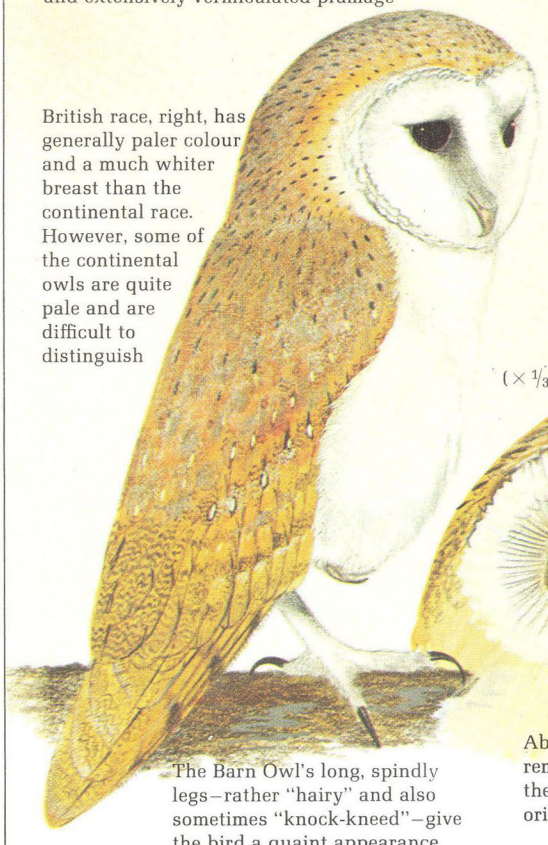
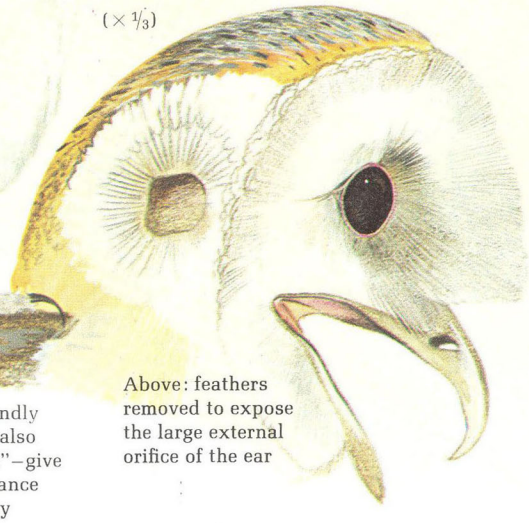
British race, right, has generally paler colour and a much whiter breast than the continental race. However, some of the continental owls are quite pale and are difficult to distinguish



The Barn Owl is easily identified by its large head, short, square tail, and medium-long wings. Colouring is a beautiful orange-buff above with grey vermiculation. The breast is either pure white or lightly marked with buff

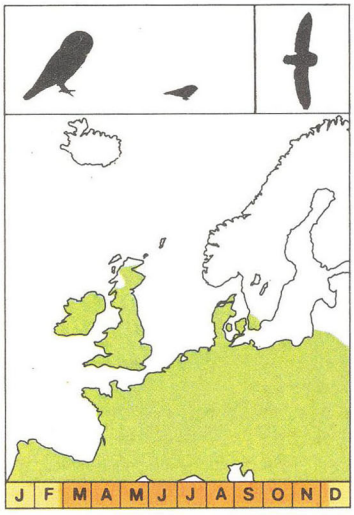
(× 1/3)



Above: feathers removed to expose the large external orifice of the ear

The Barn Owl's long, spindly legs—rather "hairy" and also sometimes "knock-kneed"—give the bird a quaint appearance belying its hunting ability

In close-up, the head of the Barn Owl shows the long, thin beak, quite unlike that of the Tawny Owl. The position of the ear is also shown. Note that the beak points downwards when the head is held in the bird's normal perching position

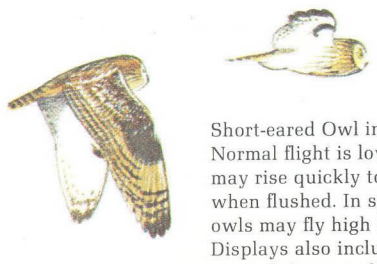


It is ironical that the status of the Barn Owl in Europe should be causing concern to conservationists, for it is essentially one of the world's most successful birds, with a huge range including at least part of every continent except Antarctica. Its present decline in Europe results largely from the use of organo-chlorine insecticides—a factor which particularly affects this species of owl because it hunts over agricultural land.

Two colour phases of the species occur in Europe: the dark-breasted form is found in the north and east of its range, the white-breasted in the south and west, including Britain. Traditional farmland provides it with an ideal habitat, combining open ground for hunting with hedgerows and barns for roosting and breeding. Modern farming methods which involve the elimination of hedgerows and erection of less hospitable outhouses have been additional factors in its recent decline. Rodents are its main prey, although the diet appears to be more varied in southern Europe.

Large cavities in buildings or in dead trees provide nest sites. Like many owls, its breeding success is strongly correlated with the population fluctuations of rodents. Clutch sizes vary from three to 11, and the eggs are more pointed in shape than those of other owls. Incubation, by the female alone, lasts 32 to 34 days, and both sexes feed the young during their nine- to 12-week fledging period.

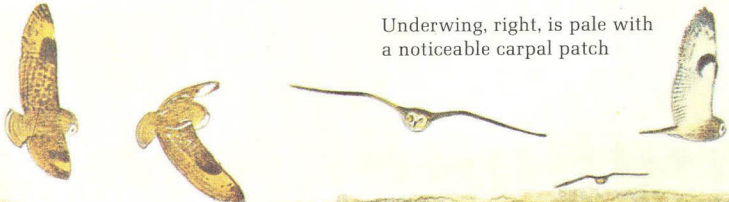
Short-eared Owl



Short-eared Owl in flight, left. Normal flight is low, but the bird may rise quickly to some height when flushed. In spring display, owls may fly high in full daylight. Displays also include sudden vertical drops and wing clapping

Short-eared Owls are wide-ranging birds of open country and often cover great distances. They are the longest winged of all the owls, but are characteristically short tailed; the head is very short and rounded

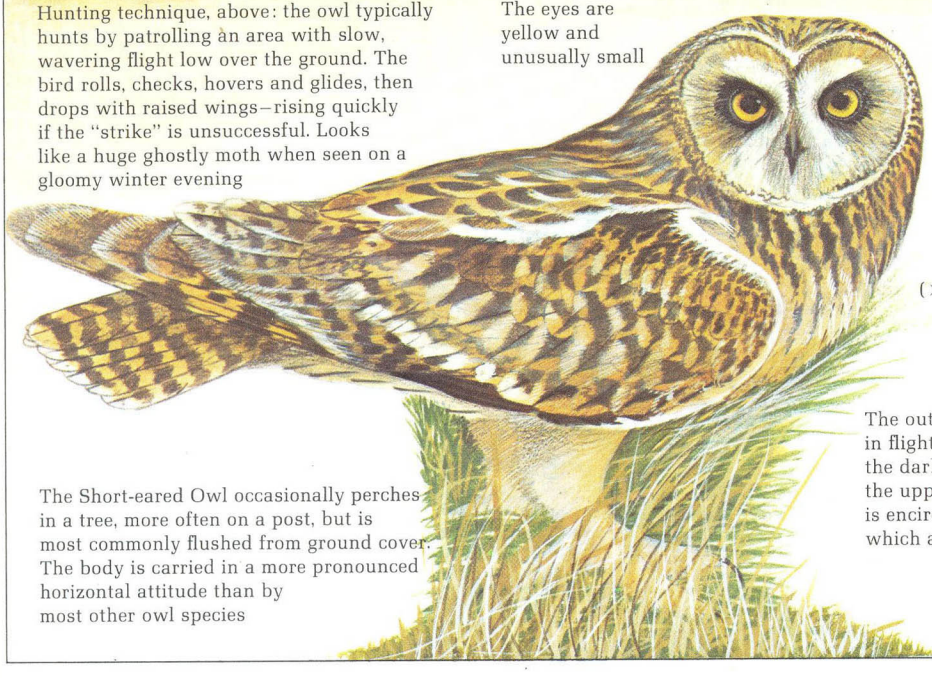
(×1/6)



Underwing, right, is pale with a noticeable carpal patch

Hunting technique, above: the owl typically hunts by patrolling an area with slow, wavering flight low over the ground. The bird rolls, checks, hovers and glides, then drops with raised wings—rising quickly if the "strike" is unsuccessful. Looks like a huge ghostly moth when seen on a gloomy winter evening

The eyes are yellow and unusually small



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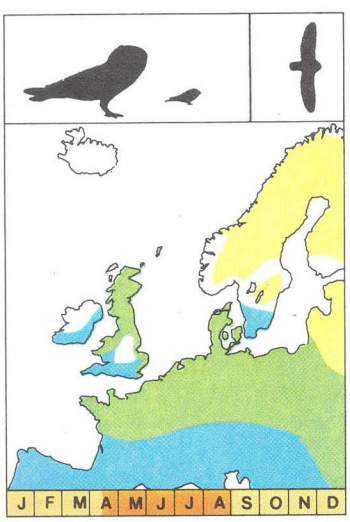
The outstretched wing in flight clearly shows the dark carpal patch on the upper wing surface. The patch is encircled by a pale orange area, which appears buff at long range

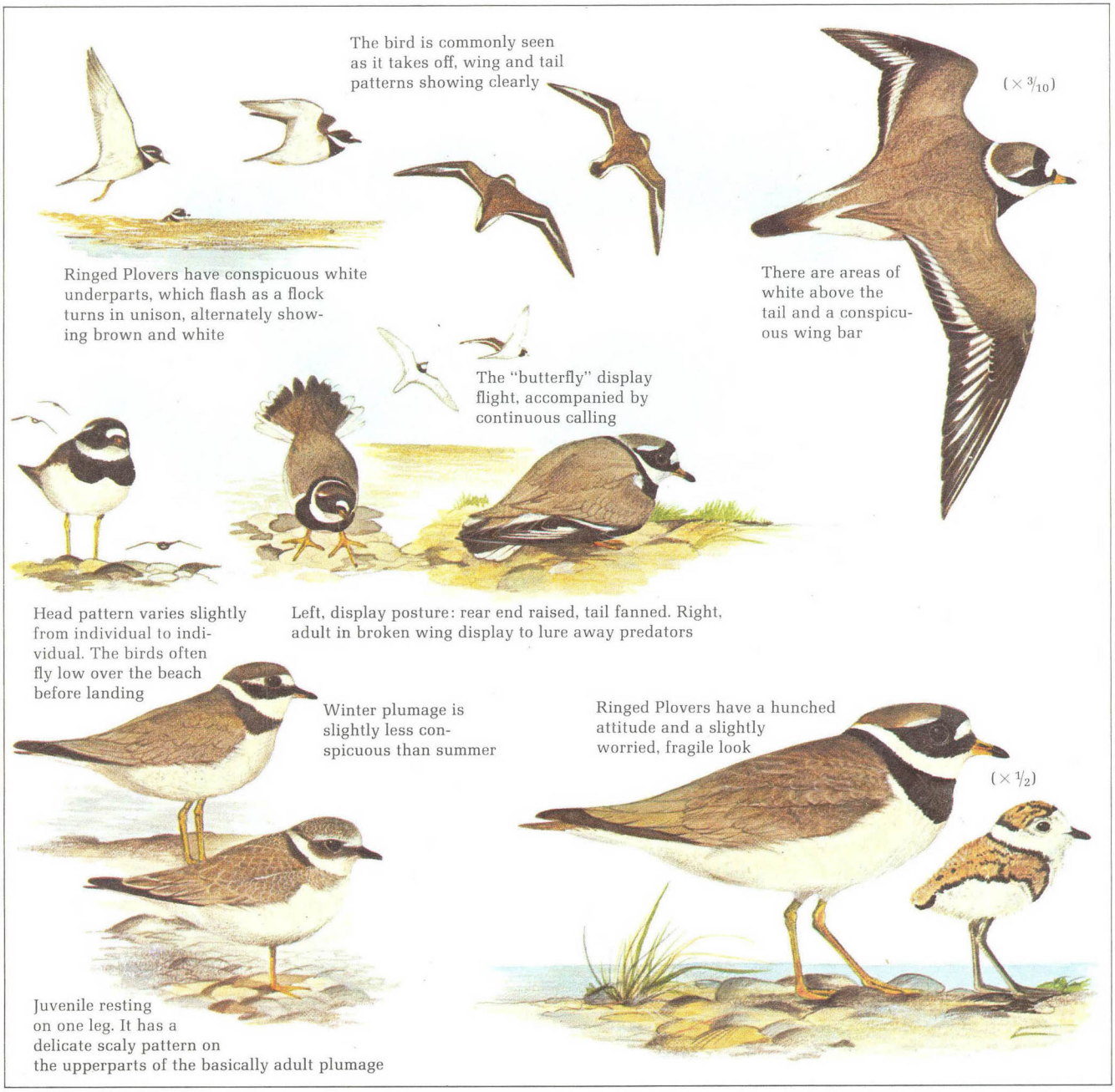
The Short-eared Owl occasionally perches in a tree, more often on a post, but is most commonly flushed from ground cover. The body is carried in a more pronounced horizontal attitude than by most other owl species

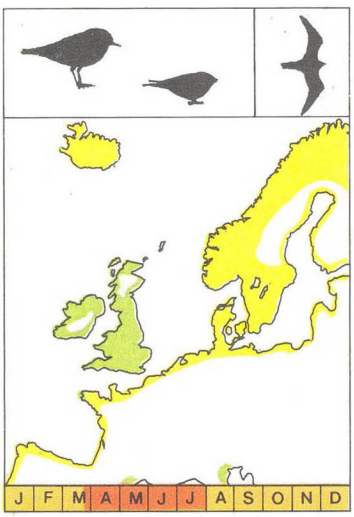


Distributed around the pole in both the New and Old Worlds, the Short-eared Owl is clearly a flourishing species, yet its success is based on a strategy quite different from that of the more obviously common Tawny Owl. Short-eared Owls are nomadic, tending to congregate in areas where there is a temporary surplus in the population of mice or voles; Tawny Owls, on the other hand, make use of detailed knowledge of the wood or park in which they are resident. Much more diurnal than other owls, the Short-eared can regularly be seen quartering open ground, such as a field or salt-marsh, in broad daylight. Groups of the birds are quite often found hunting together in this way. Although rodents make up most of the diet, Short-eared Owls also take birds, even such swift fliers as Dunlin or snipe.

The nest is normally a scrape in dense vegetation on the ground, such as heather, rank grass or brambles. Four to seven eggs are usual, but up to 14 have been recorded in years when the rodent supply has been good. The female incubates, normally from the first egg, at first somewhat intermittently. Incubation lasts 24 to 28 days, and the young are fed by the female with food brought by the male. They may begin to make short forays from the nest from two weeks onwards, but do not fly until they are three and a half weeks old. Two broods may be raised in years when voles are abundant.

Ringed Plover



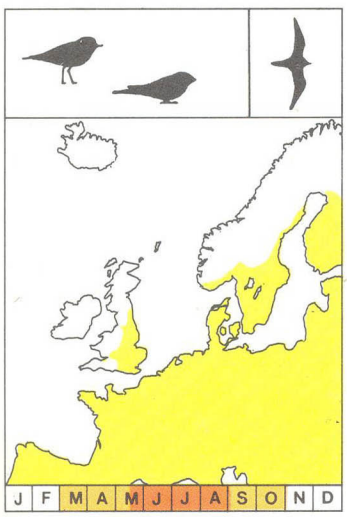


During summer, one of the characteristic sounds of shingly coastlines is the liquid call of the Ringed Plover. It is often uttered in alarm by adults with eggs or young near by, but this warning is rarely noticed by holidaymakers, whose disturbance of the birds leads to the failure of many clutches. The eggs are beautifully camouflaged in the simple scrape that serves as a nest. This protects them from marauding gulls, but increases the likelihood of them being crushed underfoot.

In some areas, Ringed Plovers nest inland, on heaths, or by gravelly streams. They usually ignore the industrial sites favoured by Little Ringed Plovers, but sometimes both occur together resulting in competition. Ringed Plovers have been known to lay eggs in a Little Ringed Plover's nest and finally oust the smaller bird completely.

Egg-laying takes place any time between April and August. There are two broods, and extra clutches are laid to replace losses through disturbance or flooding by unusually high tides. Both sexes incubate for 24 or 25 days, and the young can fly after three and a half weeks. Outside the breeding season, Ringed Plovers may be seen feeding on sandy or muddy shores with other waders such as Dunlin or Knot, but are always distinguished by their typical plover feeding tactics of runs interspersed with short pauses. Prey is driven to the surface by a rapid paddling of the wet sand with one foot.

Little Ringed Plover

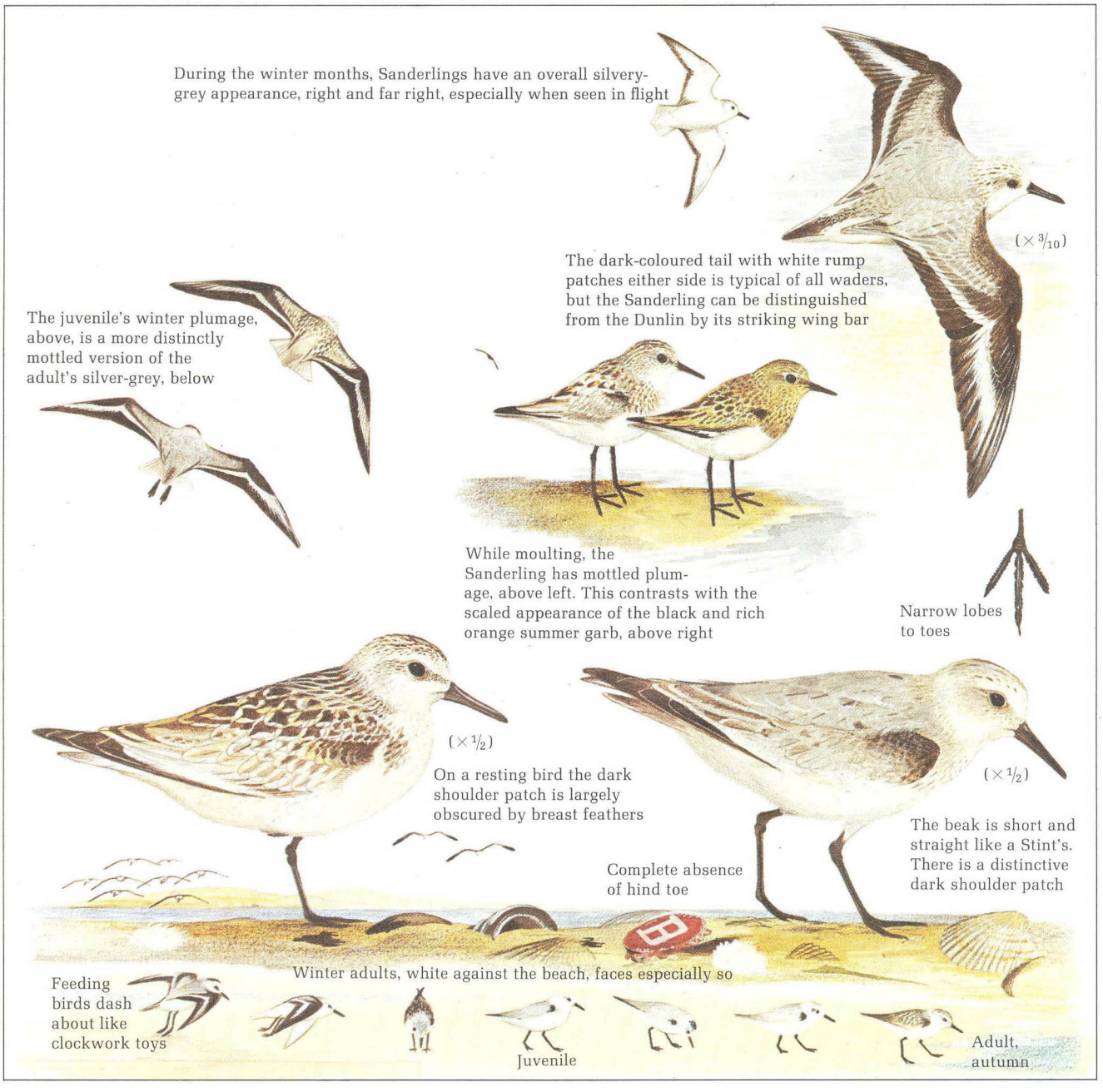


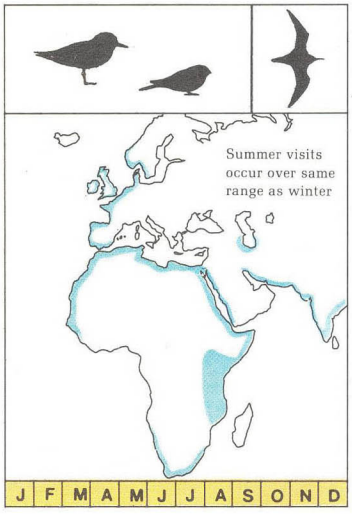
With the present steady reduction of wetland habitats, wader numbers are generally on the decline, but the story of the Little Ringed Plover in Europe provides a spectacular exception. Since the turn of the century its range has expanded dramatically northwestwards, and the spread is continuing.

This expansion has come about through the species' exploitation of man-made habitats, especially gravel pits and empty reservoirs. Natural choices are sand or gravel bars by inland lakes. Well-documented stages of its spread are those in Belgium and the Netherlands during the 1930s and in Britain since 1944. The British colonization started with two pairs; subsequent counts found 223 breeding pairs in 1967 and 467 in 1973. In view of this expansion it is surprising to find that breeding success is low: many clutches of eggs are lost to predators such as Carrion Crows, or through flooding or disturbance. Dogged perseverance in producing repeat clutches helps compensate, and a few genuine second broods are produced. Both sexes incubate the four eggs in their simple scrape, expressing alarm when disturbed with a sharp whistle quite different from the Ringed Plover's liquid call. The young hatch after 24 to 25 days, and can fly at three weeks.

Food includes a wide range of small invertebrates, and "foot paddling" (see opposite page) is even more frequent than with the Ringed Plover.

Sanderling





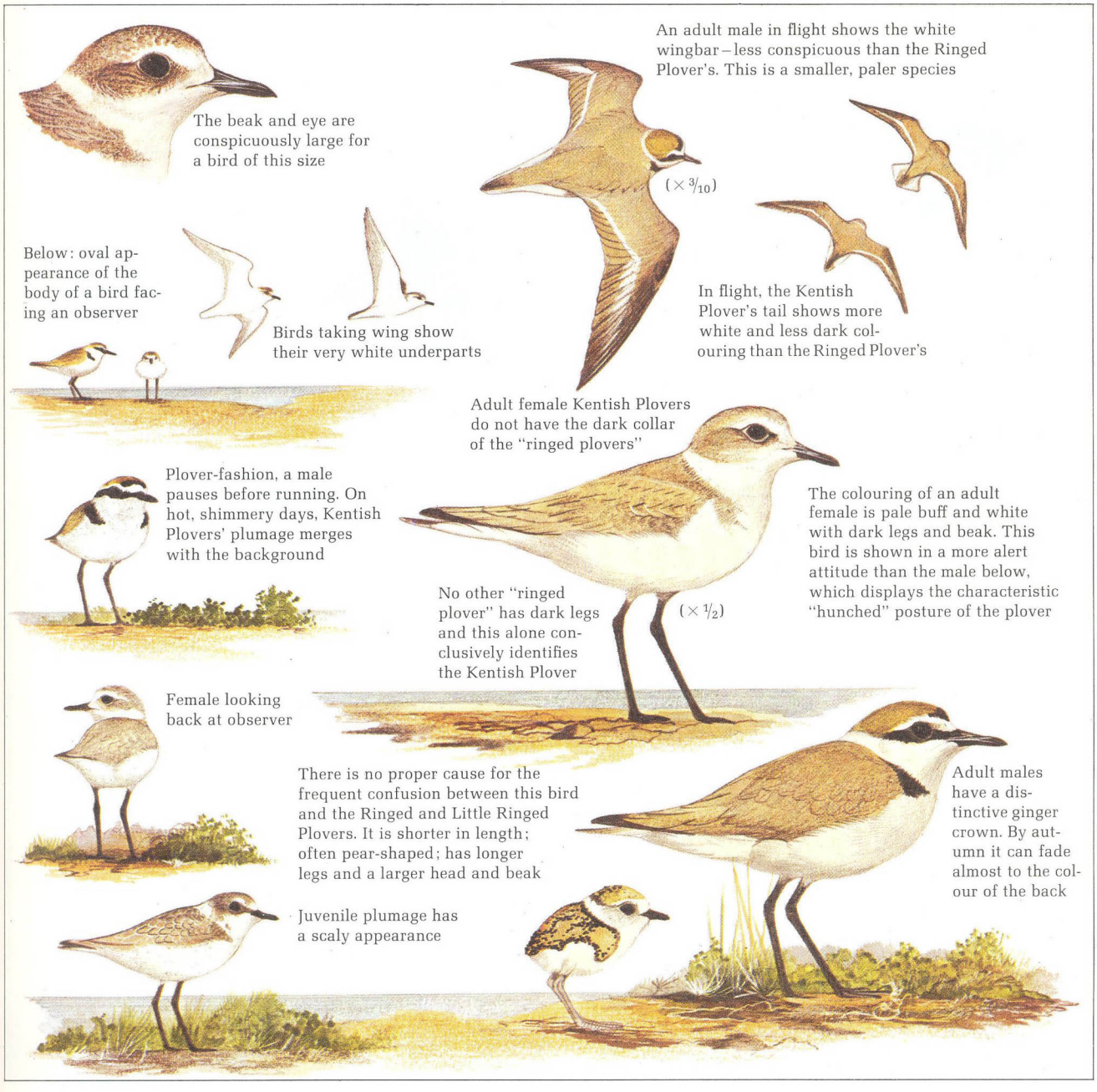
A small silver-grey and white wader, the Sanderling is unmistakable as it speeds to and fro on twinkling black legs across the long sandy beaches to which it is restricted. In Europe it is primarily a bird of spring and autumn, smaller numbers staying to winter. In late spring, adults may be seen in mottled red-brown breeding plumage. A few first-year birds may stay the summer. Sanderlings feed on small crustaceans, seized as they follow the surf in and out.

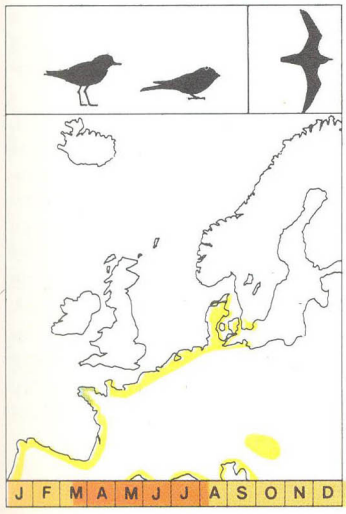
The Arctic breeding season is short – as little as six weeks – and with some pairs the female lays two clutches in separate nests on arrival, incubating one herself and leaving the other to the male. Young are fed insects and larvae.

Sanderlings rank amongst the world's most travelled birds: Arctic breeders penetrate down South America to the Falkland Islands, through Africa to the Cape, and also to Australasia, always inhabiting sandy beaches.

They are confiding birds, often running away rather than flying, and rarely occur in flocks of more than a few dozen. European beaches serve as fattening areas for further journeys – studies have shown that their weight may double in a fortnight here. The journey from tundra to South Africa may thus be achieved in two giant flights. It is believed that only Greenland breeders make this long migration, while Siberian birds winter on European coasts.

Kentish Plover





This bird's English name is wildly inapt for a species distributed throughout four continents. Moreover, it ceased to breed in Britain in 1955.

The Kentish Plover is an active, nimble bird, which runs faster and more frequently than the Ringed Plover. It is also surprisingly confiding in the presence of human observers, unless there is a nest near by. When disturbed in the presence of the young, it reacts, like Ringed and Little Ringed Plovers, with a vigorous and realistic injury-feigning display. The nest is basically a scrape, as with the other two species of plover, but often has a sparse lining of shells, dead leaves or seaweed. Its situation varies considerably: like the Ringed Plover's, it may be built on open shingle, but dried mud, dead seaweed or grassy places are also occupied, though always close to the sea.

The display flight of the male, with slow, butterfly-like wing actions, also resembles that of the other two species. Three or four eggs are laid, and incubated by male and female in turn for about 24 days. Feeding places are sandy or muddy flats, where the birds feed well spaced out over the shore. "Foot paddling" is frequently used to stir up prey in shallow water.

Kentish Plovers are probably sedentary in many parts of their range, but more northerly breeders at least move south, wintering mainly on Mediterranean shores when they may be seen on passage in unlikely areas.

Dunlin

R

Commonest of all waders, the Dunlin in summer plumage can be identified by its black belly alone, which remains on most birds until September. Confusion, principally with the Little Stint, arises over full winter plumage, and over juveniles. For these the distinguishing factors are the Dunlin's down-curved beak, more portly appearance, more heavily streaked breast and spotted flanks retained until October

Adult, summer

Juvenile

Adult, winter

A juvenile in autumn plumage, below, can be confused with the Little Stint. The expert distinguishes the birds in flight on size alone

Adult, winter plumage

(× 3/10)

Dunlin of all ages and states of plumage retain the conspicuous wing-bar and tail markings

Dunlin may prove exceptionally tame if approached slowly. They are frequently found inland on flooded terrain, sewage farms and reservoirs

Immature

Winter

An active feeder, the Dunlin alternates periods of rest with intense food-searching

A massed flock of Dunlin, below, can be identified by its elongated shape. As the birds wheel, the whole mass flickers grey and white

Left, "stitching", the pattern left by a feeding Dunlin as it probes across the sand or mud

Like other waders, the Dunlin is occasionally seen swimming

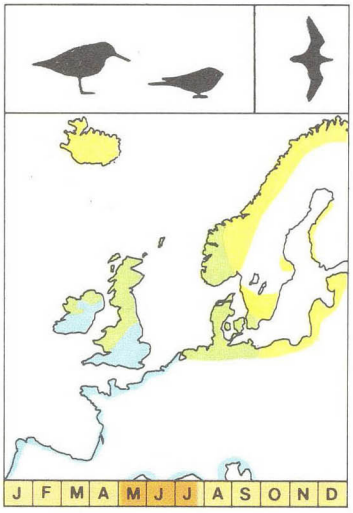
Adult, breeding season: a rufous back and black belly

One-day-old chick

Adult, winter plumage: a grey-brown back and slightly streaked breast

(× 1/2)

Juvenile: buff, as opposed to the grey plumage of the adult

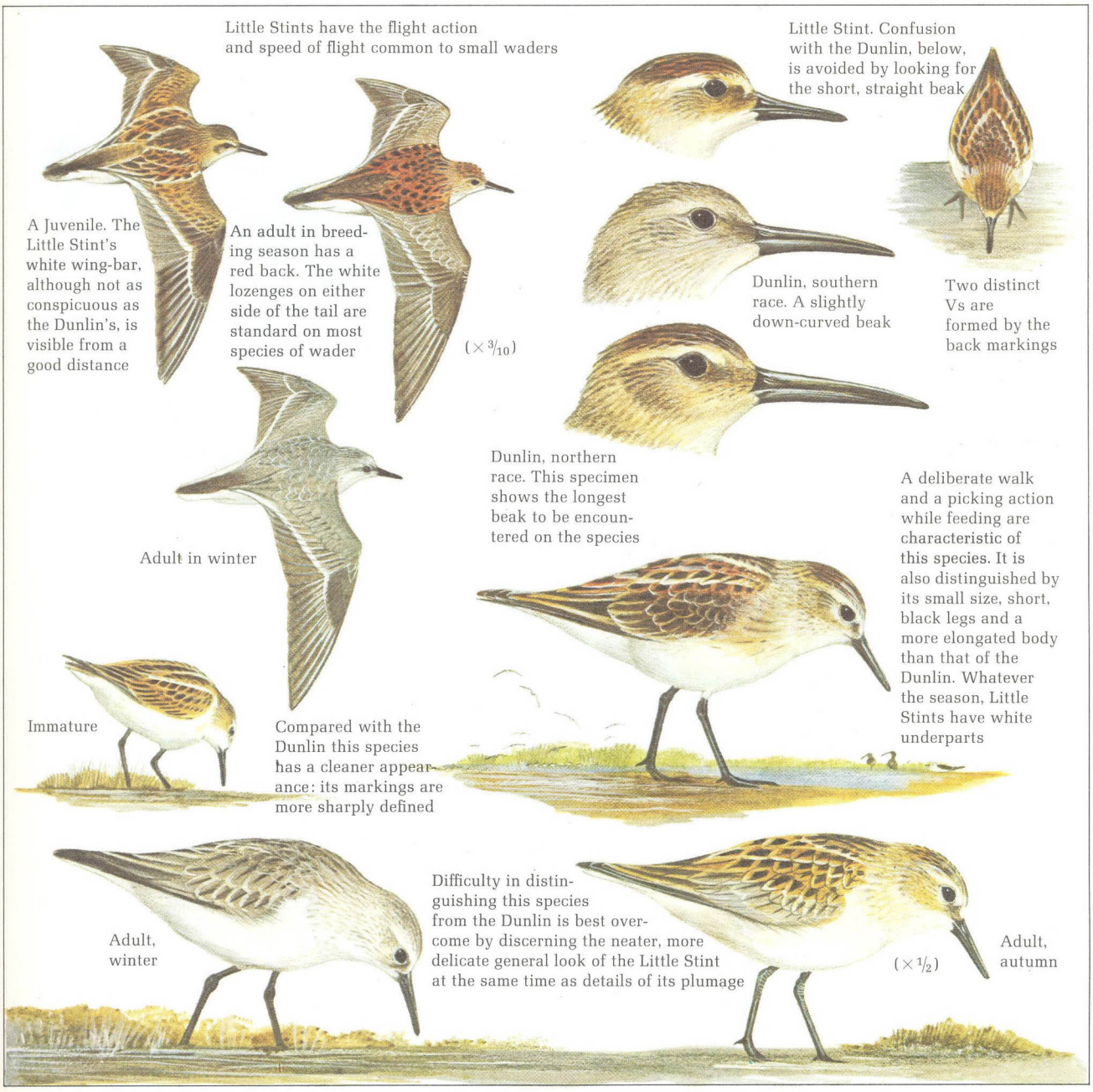


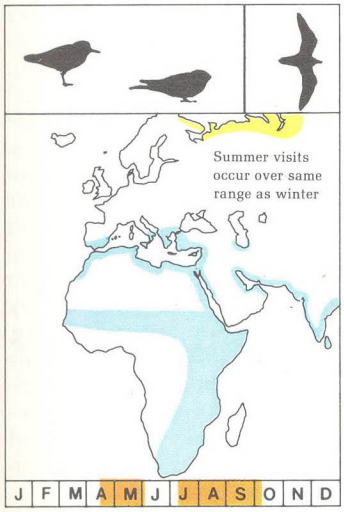
Rising and falling like an animated plume of smoke, a flock of Dunlin performing aerobatics is an extraordinary spectacle. Such displays are usually seen at high tide, when Dunlin and other waders gather on shingle banks or fields to wait until the ebb tide exposes their feeding areas. Returning to the mud, they give an impression of bustling activity, feeding with scarcely an upward glance. Pecks at the mud surface and probes below it are interspersed with bouts of "stitching"—a rapid, mechanical series of shallow probes made as the bird moves forwards, leaving a track of dots. Its purpose is to discover prey by touch, and bouts of stitching often end in a deep probe to seize a tiny crustacean or worm. Surface pecks mainly capture a tiny snail (*Hydrobia*) which exists in enormous numbers on mudflats, providing food for many waders.

The Dunlin breeds on moorland, tundra or coastal marshes over much of northern Eurasia and America. Displays, pairing and establishment of territory are completed within two weeks of arrival on the breeding grounds, and the four eggs are laid in a scrape amongst low vegetation near water. They hatch after three weeks' incubation by both parents, and the young fledge after four weeks, feeding mainly on midge larvae, while adults concentrate on those of craneflies.

Dunlin of the Arctic sub-species winter in northerly regions.

Little Stint



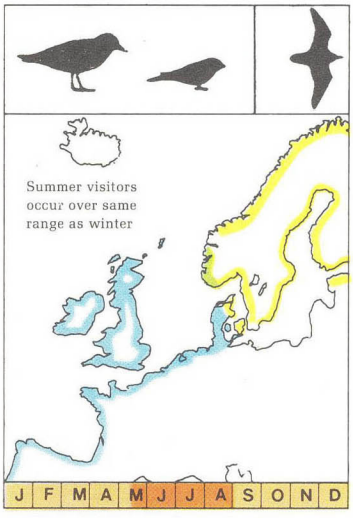


The Little Stint is one of the tiniest waders, conspicuously smaller than the Dunlin, from whose company it is rarely absent. Nevertheless, the two birds are related and their feeding methods are similar, with frequent rapid pecks interspersed with bouts of rapid, shallow test probes. Its rate of activity averages higher than the Dunlin's, reflecting its small size, and it concentrates more on molluscs or crustaceans found on the surface of mud or in shallow water. It also differs from the Dunlin in its choice of habitat on passage or in winter quarters, showing a greater preference for the edges of inland pools.

Spring and autumn migrations provide the main opportunity to see the Little Stint in western Europe. In its wintering places and on migration, it is occasionally found in flocks of several hundred, but on passage is usually seen in much smaller groups.

Its breeding areas are in the Arctic, well to the north of the scarcer Temminck Stint's. Grassy marshes or tundra are selected for nesting, and during the early part of the breeding season a prolonged trill is often uttered. This is presumably a song, though usually delivered from the ground; a hovering display flight has occasionally been observed. The typical wader clutch of four is incubated, mainly by the male, for about three weeks. The young fledge in approximately two to two and a half weeks.

Turnstone

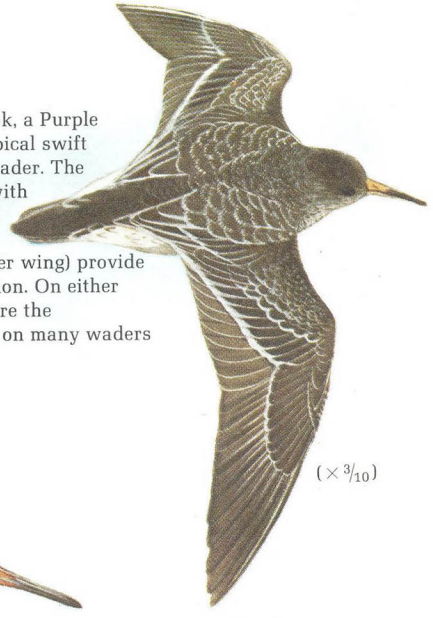


This bird's short, slightly upturned bill is adapted for prying under, or overturning, all manner of seashore objects to find food. It also lays bare estuary mud by walking forwards, pushing back the fine covering of green seaweed into rolls with its beak. Sand-hoppers and similar crustaceans are the main prey found by this means, as well as small molluscs and worms. Turnstones also eat carrion washed up on beaches –ranging from dead birds to dead humans.

In Europe, the Turnstone breeds around the coasts of Scandinavia, chiefly on rocky islets. It is believed that year-old birds do not breed at all and even those of breeding age do not breed in every year. There is relatively little display at the nest sites, but males chase intruders away from their territory, returning with a butterfly flight, and tacking a trill on to the usual chattering call. Prior to laying, the male persists in making false nest scrapes. The female makes the final one, usually sheltered by a rock, and lays four eggs, often starting to incubate with the third, so that hatching (after 21 to 23 days) is spread over two days. Both sexes incubate, the female mainly by night, the male by day. After hatching, both parents tend the young, the male remaining with them for ten or more days after they can fly. Ringing experiments on Baltic breeders indicate that they migrate down the Atlantic seaboard to western Africa and beyond.

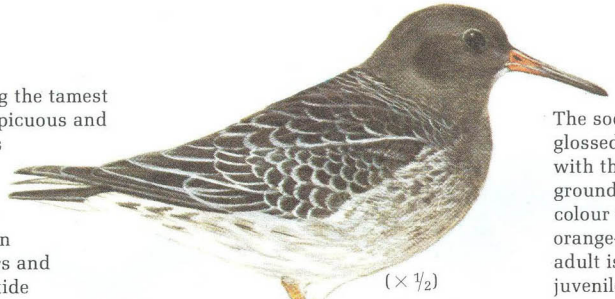
Purple Sandpiper

It is unusual to see the underwing pattern; the bird usually flies at low level



Despite its dumpy look, a Purple Sandpiper has the typical swift and easy flight of a wader. The all-dark upperparts with the pale but distinctive wing-bar (especially on the inner wing) provide conclusive identification. On either side of the dark tail are the white lozenges found on many waders

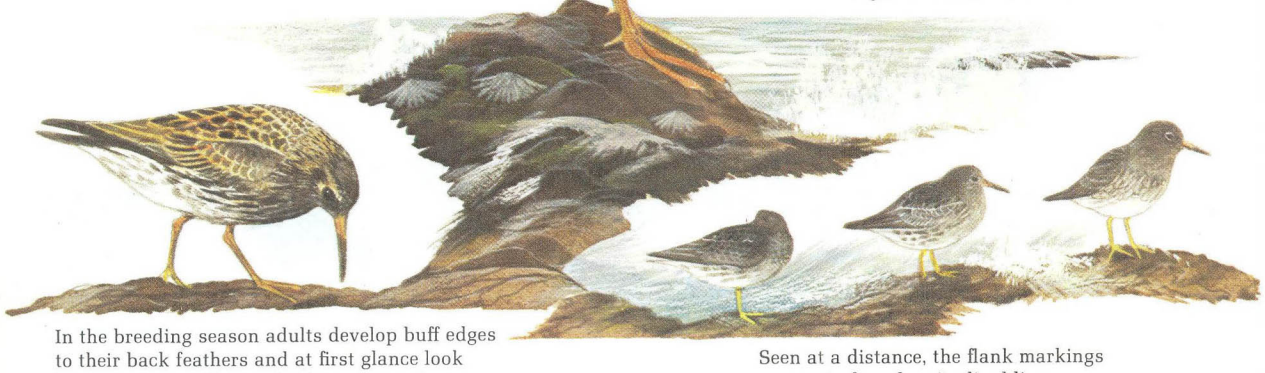
(× 3/10)



(× 1/2)

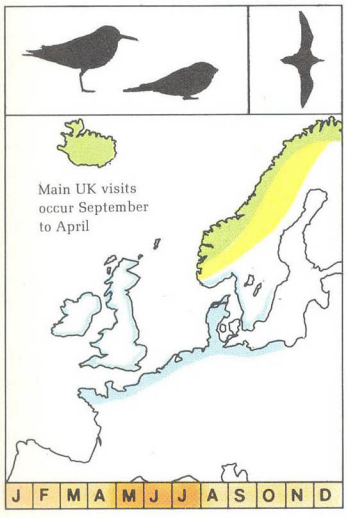
Purple Sandpipers are among the tamest of birds, but are very inconspicuous and easily overlooked. As well as their usual environment of rocky coastline they winter on mud or shingle beaches, and can also be seen on weed-covered breakwaters and slipways, especially at high tide

The sooty upperparts (faintly glossed with purple) merge easily with the bird's typical background of weed-strewn rocks. Leg colour varies from green through orange-yellow to brown. This adult is in winter plumage: a juvenile looks similar but has more patterning, and its feather edges are cream-coloured



In the breeding season adults develop buff edges to their back feathers and at first glance look entirely different from a bird in winter plumage

Seen at a distance, the flank markings appear to form longitudinal lines

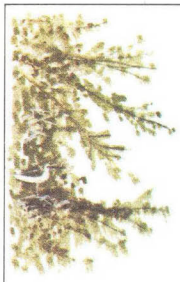


Tame in its behaviour, and charming to watch, the Purple Sandpiper should be one of the most familiar waders. In fact, it is much overlooked, probably because it is difficult to discern amongst the tumbled boulders of its rocky shore habitat, and spends much less time in flight than most waders.

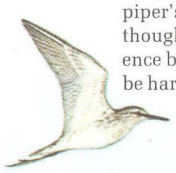
Although closely related to the Dunlin, and similar – though plumper – in build, its habits are quite different. It rarely looks for food on sand or mud, and its bill is therefore scarcely used for probing or hunting by touch – most prey is found by sight. The great bulk of its diet in winter consists of small periwinkles and dog whelks. It feeds near the edge of the sea, moving up and down the shore with the tide. Its rate of feeding is highest in the middle region of the shore, where an average time of 17 seconds to pick up ten items was recorded in one field study.

It is largely silent in winter quarters, but on the Arctic breeding grounds a wheezy trilling song is used in display flight. Courtship also includes a wing-raising performance, sometimes seen in the wintering areas. The deep nest scrape is made amongst soft, lichen-covered ground, and the four eggs are incubated mainly by the male for 21 to 22 days. Birds disturbed while incubating employ the distraction tactic of leaving the nest with head lowered, looking remarkably like a vole or lemming, behaviour parallel to the injury-feigning displays of most waders.

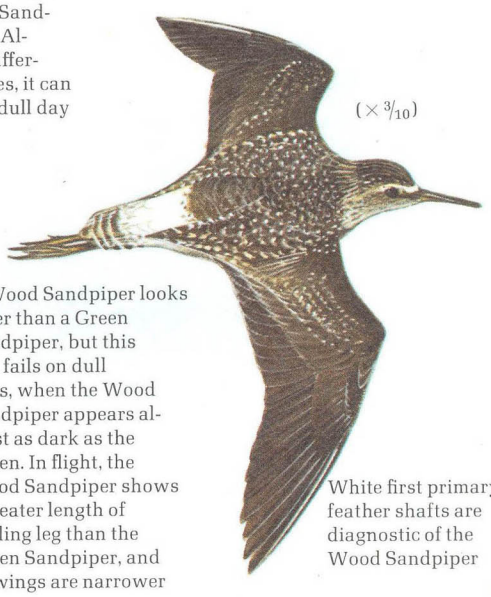
Wood Sandpiper



The Wood Sandpiper usually nests on the ground, but also commandeers the disused nests of other species



This species has a pale underwing, unlike the Green Sandpiper's, which is black. Although a key point of difference between the species, it can be hard to discern on a dull day

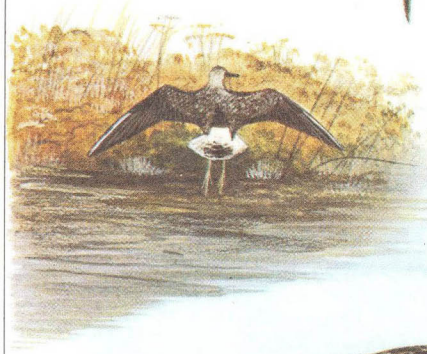


(×3/10)

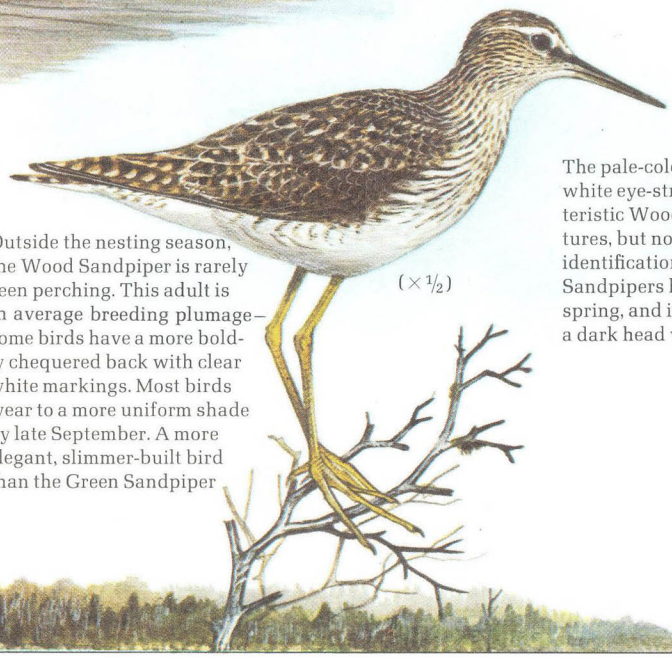
When flushed, the Wood Sandpiper rises quickly, flying off with a swift flicking action of the wings

A Wood Sandpiper looks paler than a Green Sandpiper, but this test fails on dull days, when the Wood Sandpiper appears almost as dark as the Green. In flight, the Wood Sandpiper shows a greater length of trailing leg than the Green Sandpiper, and its wings are narrower

White first primary feather shafts are diagnostic of the Wood Sandpiper



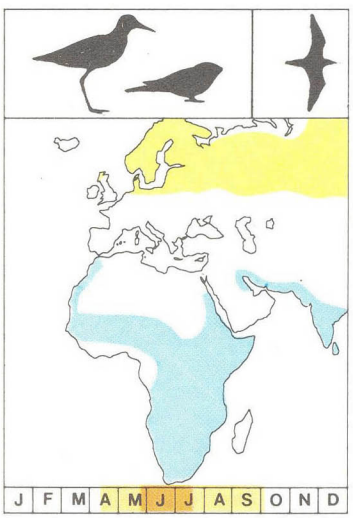
Left, a typical view of this wader as it negotiates a particularly unstable patch of mud. In this posture the white open tail is eye-catching, as is the white shaft of the first primary feather



(×1/2)

Outside the nesting season, the Wood Sandpiper is rarely seen perching. This adult is in average breeding plumage – some birds have a more boldly chequered back with clear white markings. Most birds wear to a more uniform shade by late September. A more elegant, slimmer-built bird than the Green Sandpiper

The pale-coloured head and white eye-stripe are characteristic Wood Sandpiper features, but not conclusive identification: adult Green Sandpipers have pale heads in spring, and in autumn they have a dark head with a white eye-ring

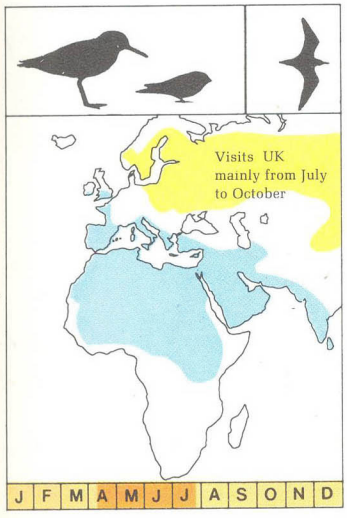


Boggy clearings or lake shores among sub-Arctic birch or conifer woods are typical breeding grounds for the Wood Sandpiper, though farther north it nests on open tundra with only dwarf willow as cover. It is the most numerous wader in Finland, with an estimated 180,000 breeding pairs. A few pairs breed in Germany, Denmark and Scotland.

The breeding season starts with display flights, made by both sexes, consisting of alternating glides and flutters. There are two distinct songs, one of which sounds reminiscent of the clear, descending notes of the Woodlark, the other being indescribable. The nest is usually a simple hollow in the ground lined with grass. Four eggs are laid, and incubated for 22 to 23 days by both sexes. The female takes the largest share of this task, but after the eggs hatch, she soon leaves the care of the young to her mate. Fledging takes about four weeks. Outside the breeding season, Wood Sandpipers are found mainly by pools on fresh marshes or sewage farms, rising with a characteristic call when disturbed. They feed both from water and by probing soft mud, obtaining small crustaceans, fly larvae, water beetles and the like.

In most of western Europe Wood Sandpipers are seen only on passage, usually in fairly small numbers, though gatherings of some thousands – mainly Scandinavian birds – occur in the Camargue, where the moult takes place.

Green Sandpiper



Even more of a woodland bird than the Wood Sandpiper, the Green Sandpiper breeds almost entirely in either broad-leaved (birch and alder) or coniferous forest, but exceptions do occur, such as the pair which bred in Scotland in 1959, choosing wet moorland with only scattered pines.

During the early part of the breeding season the birds perform various ground displays with wings spread and tail fanned. Aerial display consists of alternating climbs, with rapidly beating wings, and steep downward glides. The song is a mixture of staccato, long-drawn and liquid notes. Usually, the nest site is the old nest of another bird, such as Fieldfare, Jay or Wood Pigeon, at heights of up to 45 feet or more. The usual clutch of four eggs is incubated by both sexes for 20 to 23 days. On hatching, the young tumble to the ground, their light weight and thick down protecting them from harm. Fledging takes about four weeks, the male having sole charge of the brood after a few days. On passage and in winter quarters, the Green Sandpiper stays in situations providing plenty of cover, and is therefore likely to be unexpectedly flushed. While breeding, this species probes less than the Wood Sandpiper, mainly eating tiny aquatic animals.

Western populations of Green Sandpiper winter in Europe, from Britain south to Portugal, though birds from farther east migrate as far as Africa.

Uncommon Waders

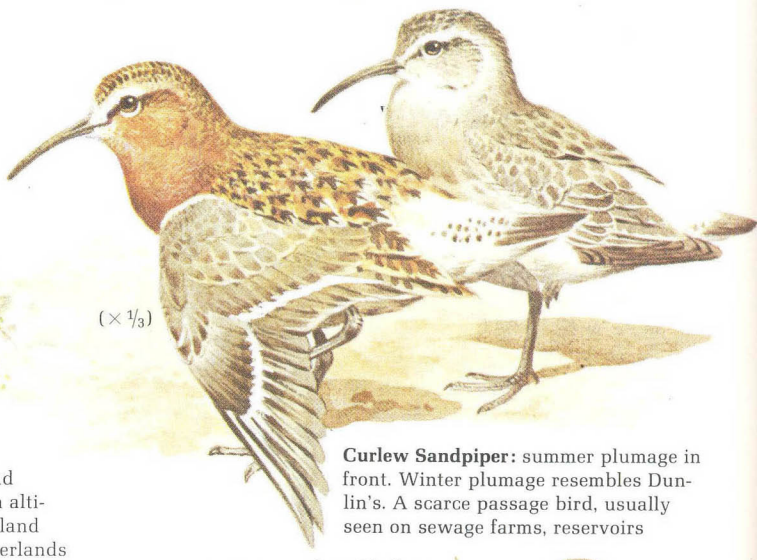
Many birds come to Europe regularly but in very small numbers, either to breed or to pause while on passage. Others are intermittent and very rare migrants, including 16 North American species. The birds on this page are found regularly in suitable places.

(× 1/3)

Red-winged Pratincole: resembles large Swallow in flight, and feeds on aerial insects, often in noisy, chattering flocks. Breeds in southern Europe on dry open land near water. May be active at twilight

(× 1/4)

Dotterel: male brooding, female and winter bird behind. Breeds at high altitude in Alps, Scandinavia; in Scotland and on reclaimed land in the Netherlands



(× 1/3)

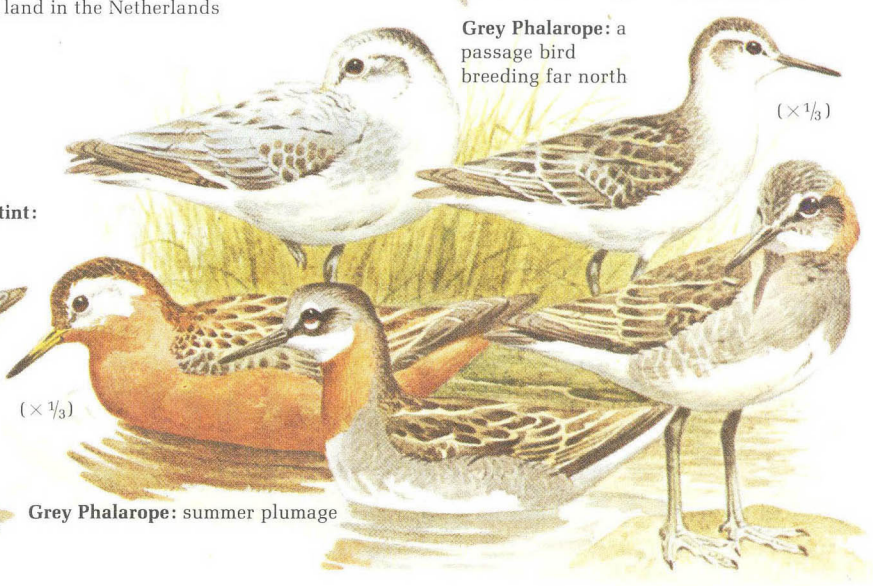
Curlew Sandpiper: summer plumage in front. Winter plumage resembles Dunlin's. A scarce passage bird, usually seen on sewage farms, reservoirs

Grey Phalarope: a passage bird breeding far north

(× 1/3)

(× 1/2)

Temminck's Stint: looks very small in field



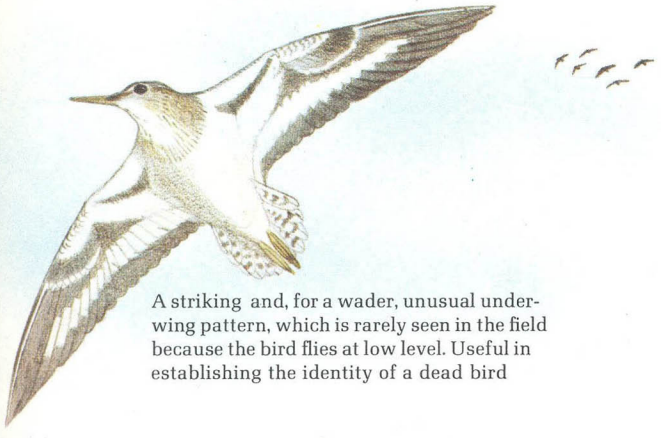
(× 1/3)

Grey Phalarope: summer plumage

Temminck's Stint, summer: breeds Scandinavia; scarce passage bird elsewhere

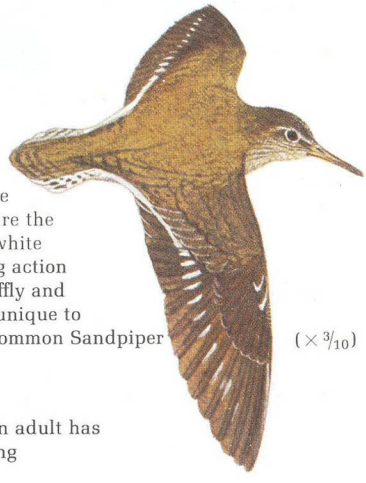
Red-necked Phalarope: summer female swimming, moulting male in front, winter male or female behind. Like Grey, very tame. Breeds by tundra lakes: a rare passage bird

Common Sandpiper



A striking and, for a wader, unusual underwing pattern, which is rarely seen in the field because the bird flies at low level. Useful in establishing the identity of a dead bird

Especially at dusk in autumn, a noisy party of Sandpipers may be seen flying about at some height—a preliminary to migration. At almost all other times the Common Sandpiper will be seen flying low over water



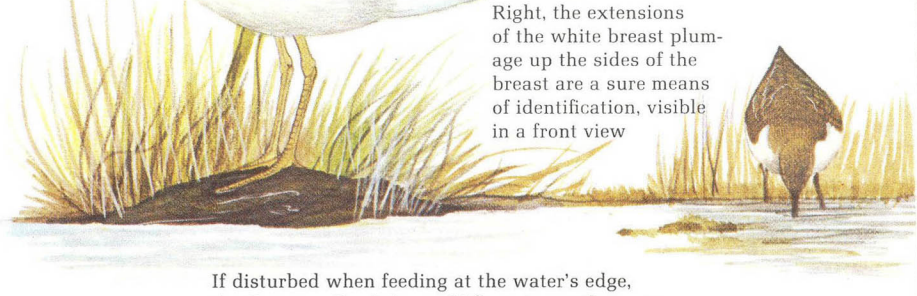
Visible on an airborne Common Sandpiper are the white outer tail and white wing-bar. The flicking action of the wings, held stiffly and slightly forwards, is unique to (and typical of) the Common Sandpiper

(× 3/10)

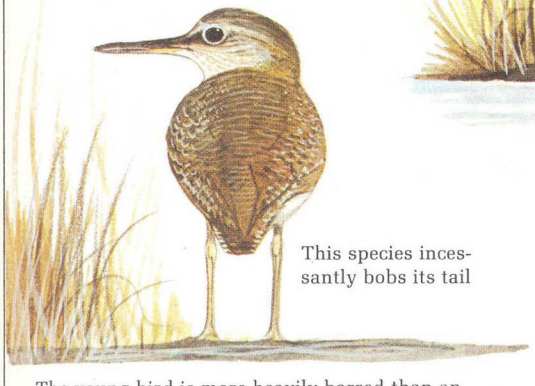
By the time it is two days old a Common Sandpiper chick forages for itself

(× 1/2)

In summer an adult has dark streaking

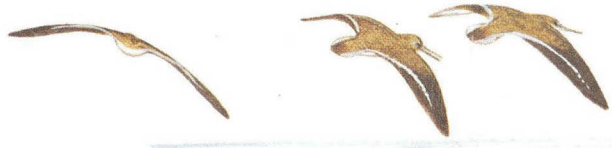


Right, the extensions of the white breast plumage up the sides of the breast are a sure means of identification, visible in a front view

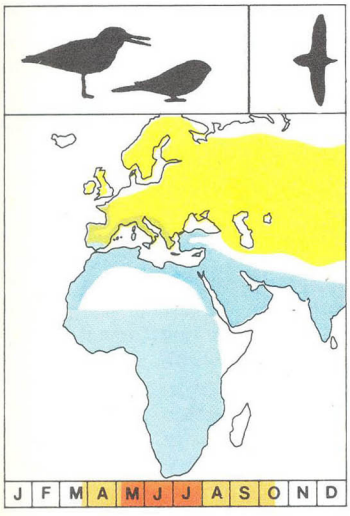


This species incessantly bobs its tail

If disturbed when feeding at the water's edge, the Common Sandpiper will fly out over the water and swing round in a wide arc to return to the shore a few hundred yards farther on



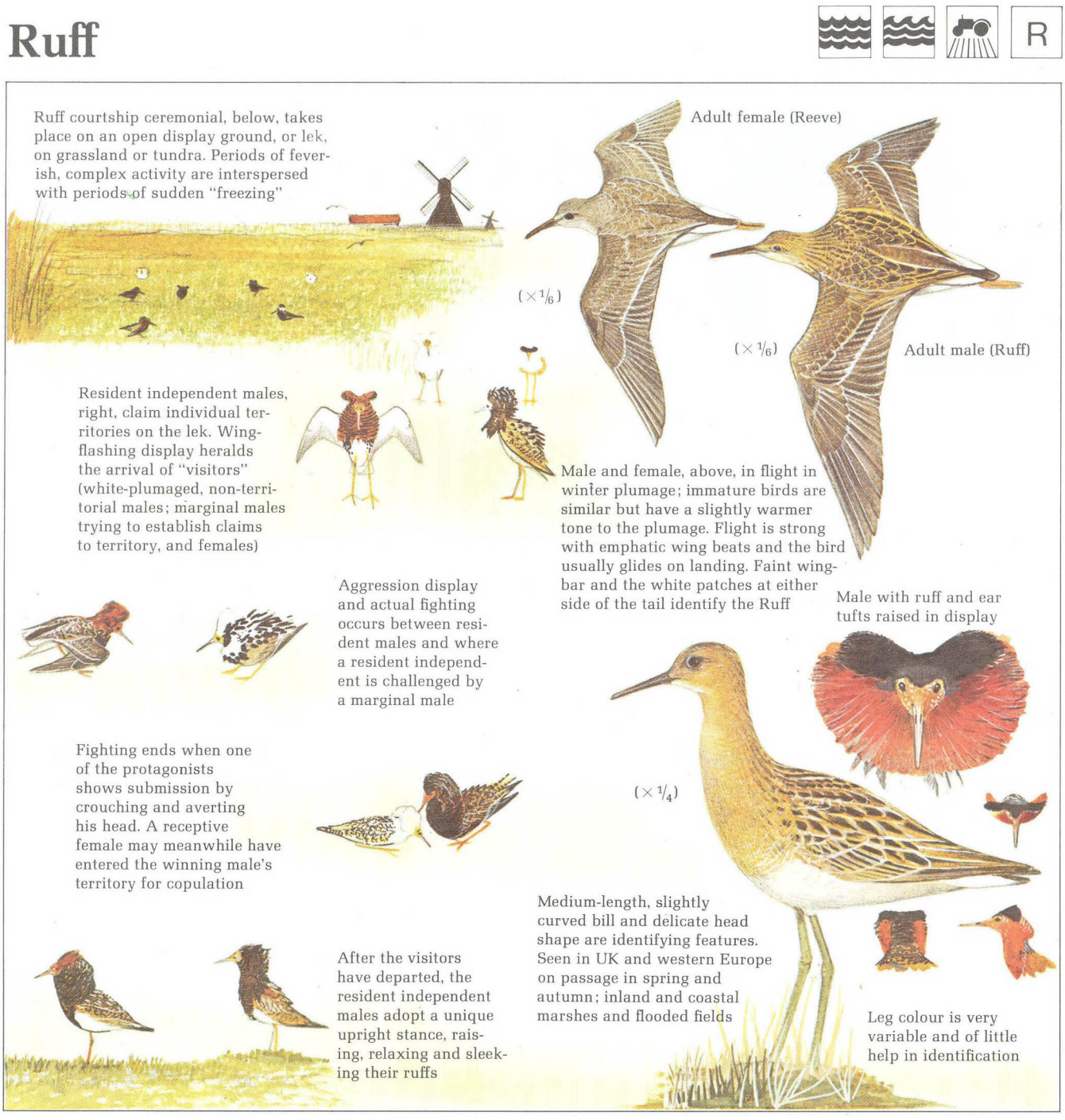
The young bird is more heavily barred than an adult, but this will only be seen at close range

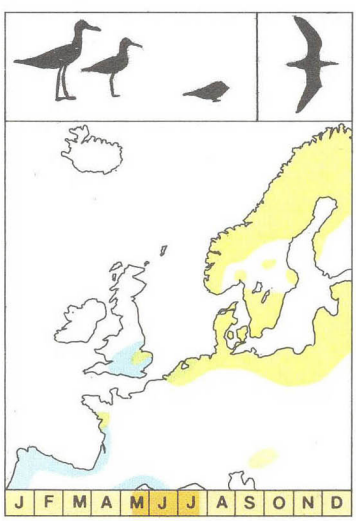


Swift-flowing rocky streams are the typical breeding habitat of the Common Sandpiper, though if sufficiently clear, still waters are suitable. Like the Dippers and wagtails with which it shares its living space, this trim little wader has the habit of making regular "teetering" movements—a feature of bird behaviour which has yet to be satisfactorily explained.

Common Sandpipers arrive at their breeding areas in April, and the pairing and courtship phase is marked by spectacular display flights in which the male circles higher and higher uttering a trilling song. He may dive at other males, and fierce fighting occurs on the ground. Both sexes make nest scrapes, the female choosing one to line with scraps of vegetation. The site chosen is usually in vegetation, but sometimes on quite exposed shingle banks. Both sexes incubate the four eggs, which hatch in 21 to 23 days. The young fledge in about four weeks, and there is only one brood. Injury-feigning is used to distract intruders from the young, and there are reports of adults carrying chicks between the legs to remove them from danger. Outside the breeding season, Common Sandpipers are seen in passage on a variety of waters and on the coast, where they prefer channels and creeks on saltings or fresh marshes to open shores. In all situations they feed by picking tiny animals from the surface of rocks, mud or shallow water.

Ruff





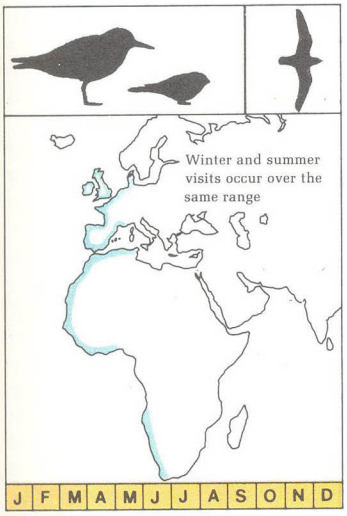
Complex in breeding behaviour, beautiful in plumage, the Ruff is truly an amazing bird.

Display and mating take place only at communal display grounds, or leks. Several groups of birds throughout the world have evolved lek behaviour, and in Europe the Black Grouse provides another example. Among them the Ruff is unique because of its system of independent and satellite males linked with individual plumage variations.

Independent males establish leks, and acquire display territories on them by threatening or fighting other males. Satellite males may share territories with independent males, but do not take part in their defence. They show little aggression, otherwise independent males would not tolerate them, and on large leks they achieve mating only infrequently. On small leks they are more successful, and their presence seems to have some value in attracting females to the site. Only males on territories have any chance of being selected for mating by the females that visit the lek; some, usually the young or very old ones, hold no territories, and can only linger around the margins of the lek. However, in time, the young ones will dispossess territory holders and establish themselves.

Nests are made in the general vicinity of the lek, but are often well hidden amongst rough grass or sedges. The female carries the entire burden of incubation and care of the young.

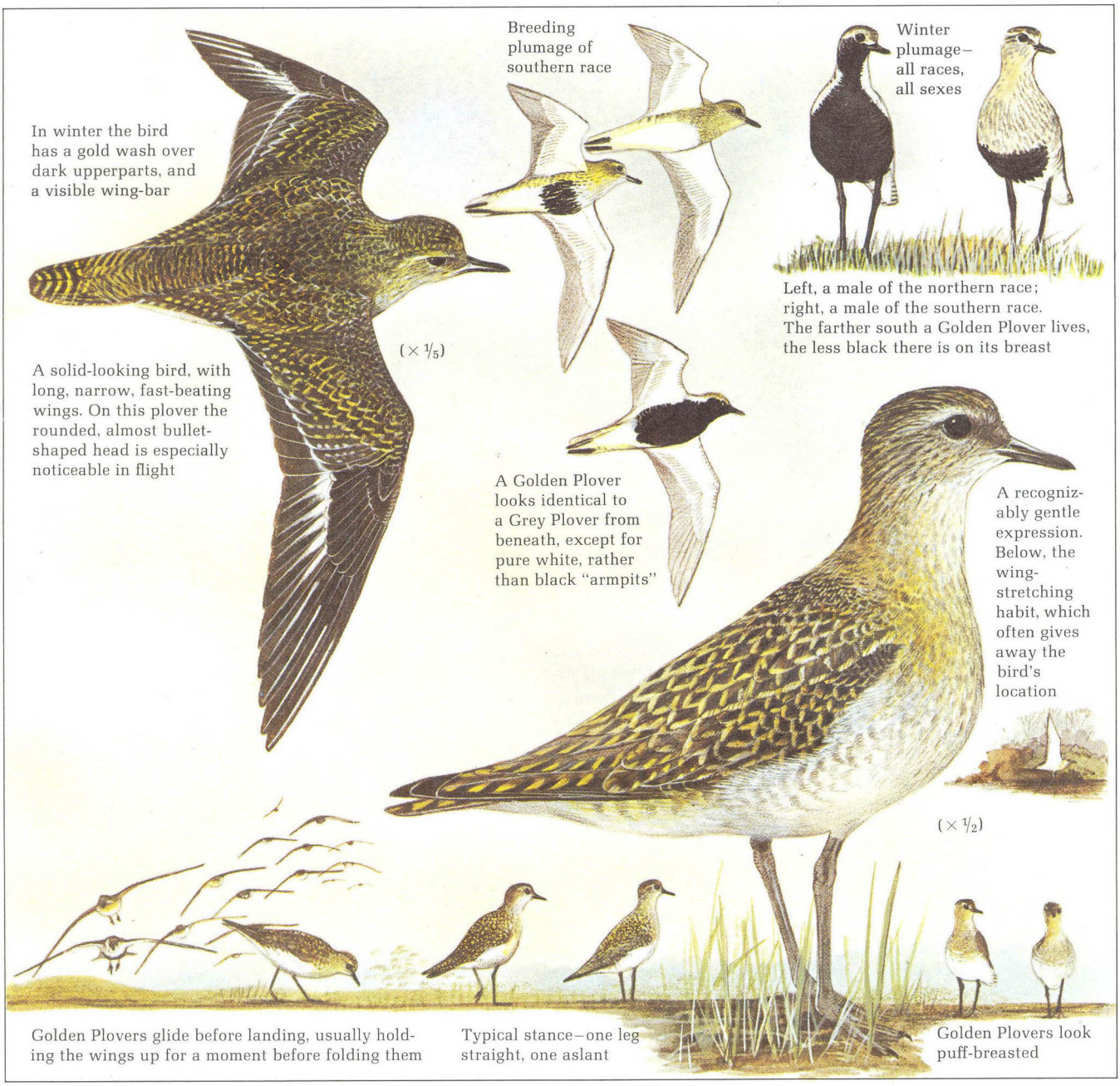
Knot

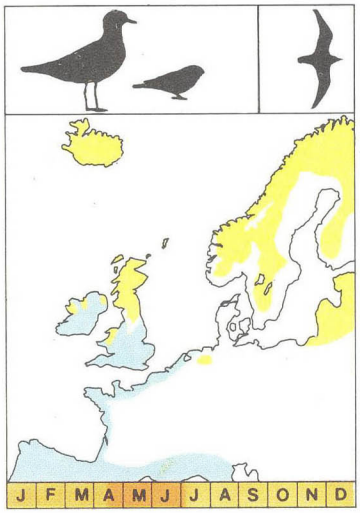


King Knut (Canute), who tried to turn back the waves, is said to have found these plump waders good eating, and their name is supposed to derive from his. Alternatively, as shore birds they may simply have been associated with the king whose reputation was made on a beach. Knot are larger than their near relative the Dunlin, in whose company they often feed. Their greater size is reflected in a slower feeding rate, illustrating an inverse relationship between size and activity which is general throughout the animal kingdom. Otherwise, their feeding behaviour is similar to the Dunlin's, though Knot concentrate more on surface prey such as small periwinkles and other molluscs. Knot are high Arctic breeders, nesting on open tundra sparsely covered by lichens. The four eggs are laid as soon as snow cover disperses, usually in the latter half of June. Both parents incubate, the eggs hatching in 21 days. The young are then led to more marshy ground, where insect larvae can be found.

Knot winter on the coasts of western Europe, as far south as West Africa; British coasts hold the largest number, 250,000 in mid-winter. Various schemes have been proposed for building tidal barrages or carrying out reclamation schemes in several of their main winter habitats, and to help forecast the effects of such developments on the Knot, its populations and migrations are the object of intensive research.

Golden Plover

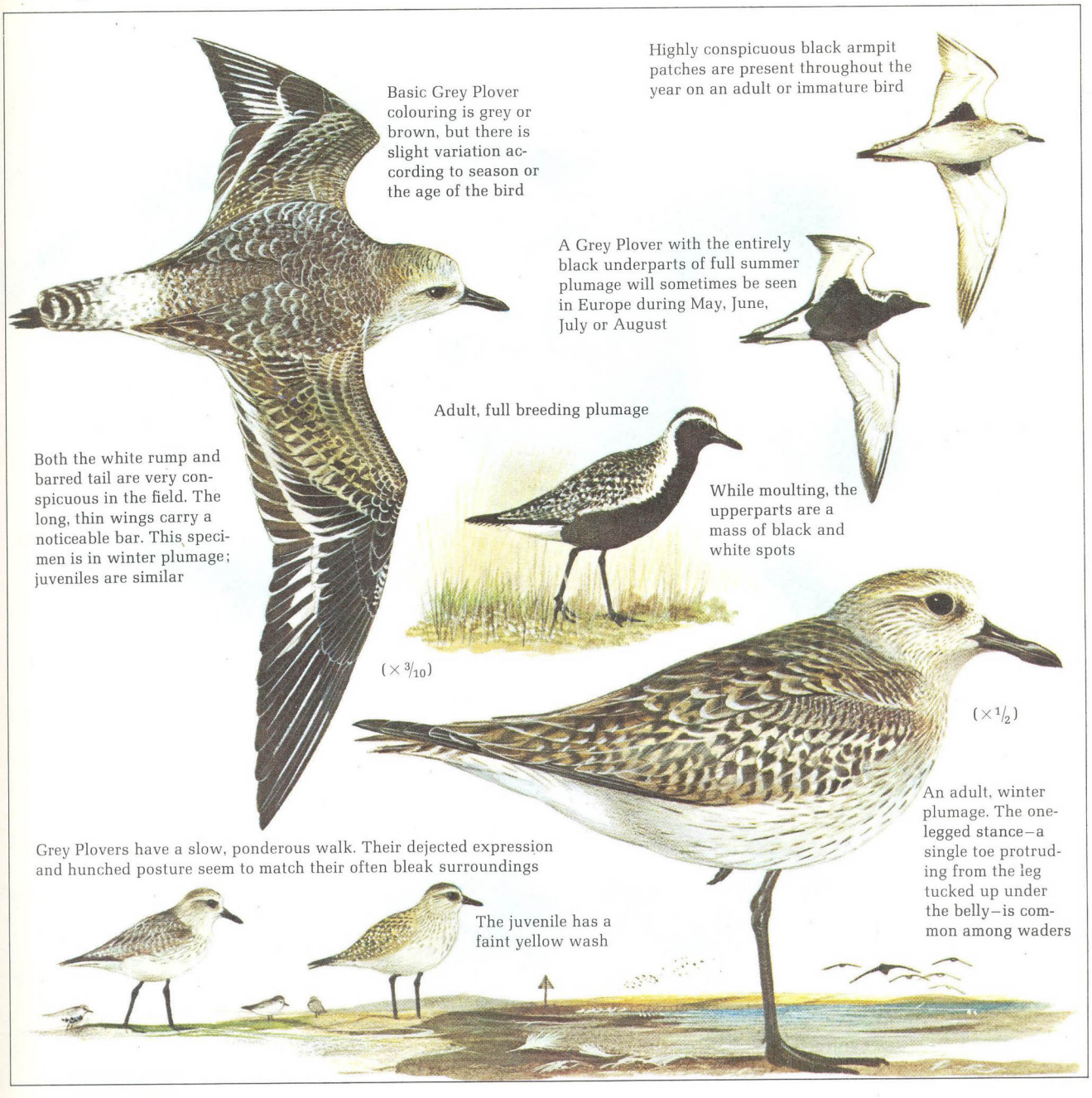


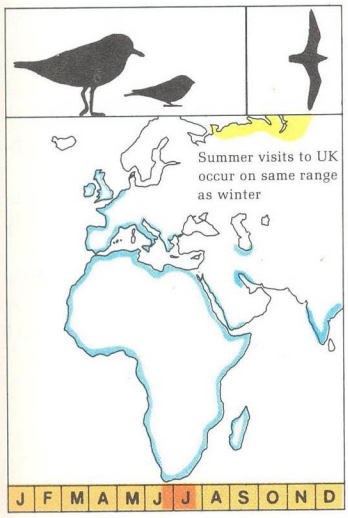


Pasture and meadowland, often well inland, are the winter habitat of the Golden Plover, where its liquid calls are as much a sound of the country as the chuckling of Fieldfares. Moving from field to field, Golden Plovers fly in tightly bunched flocks, which spread out on landing to feed in the usual plover fashion–short runs alternating with brief pauses. When detected, prey is seized by sudden grabs, and the many earthworms captured usually break off near the head–a wasteful method compared with that of the Curlews often found on the same fields, whose long bills can extract worms much more completely. However, the run-and-snatch method is ideal for the capture of such surface prey as beetles, and the slugs and fly larvae often found under straw or grass roots are also eaten in large quantities. The shore (where small molluscs are the prey) is usually a subsidiary feeding place, except during hard frosts. However, in coastal areas it is used for roosting–though when there is bright moonlight, Golden Plovers stay feeding on the fields all night.

In early spring, birds still in winter quarters may be heard uttering their song–a beautiful trilling phrase, repeated in descending pitch–and many assume their striking summer plumage before leaving. The breeding habitat is moorland or tundra, where the nest is made in a depression amongst grass or lichen.

Grey Plover

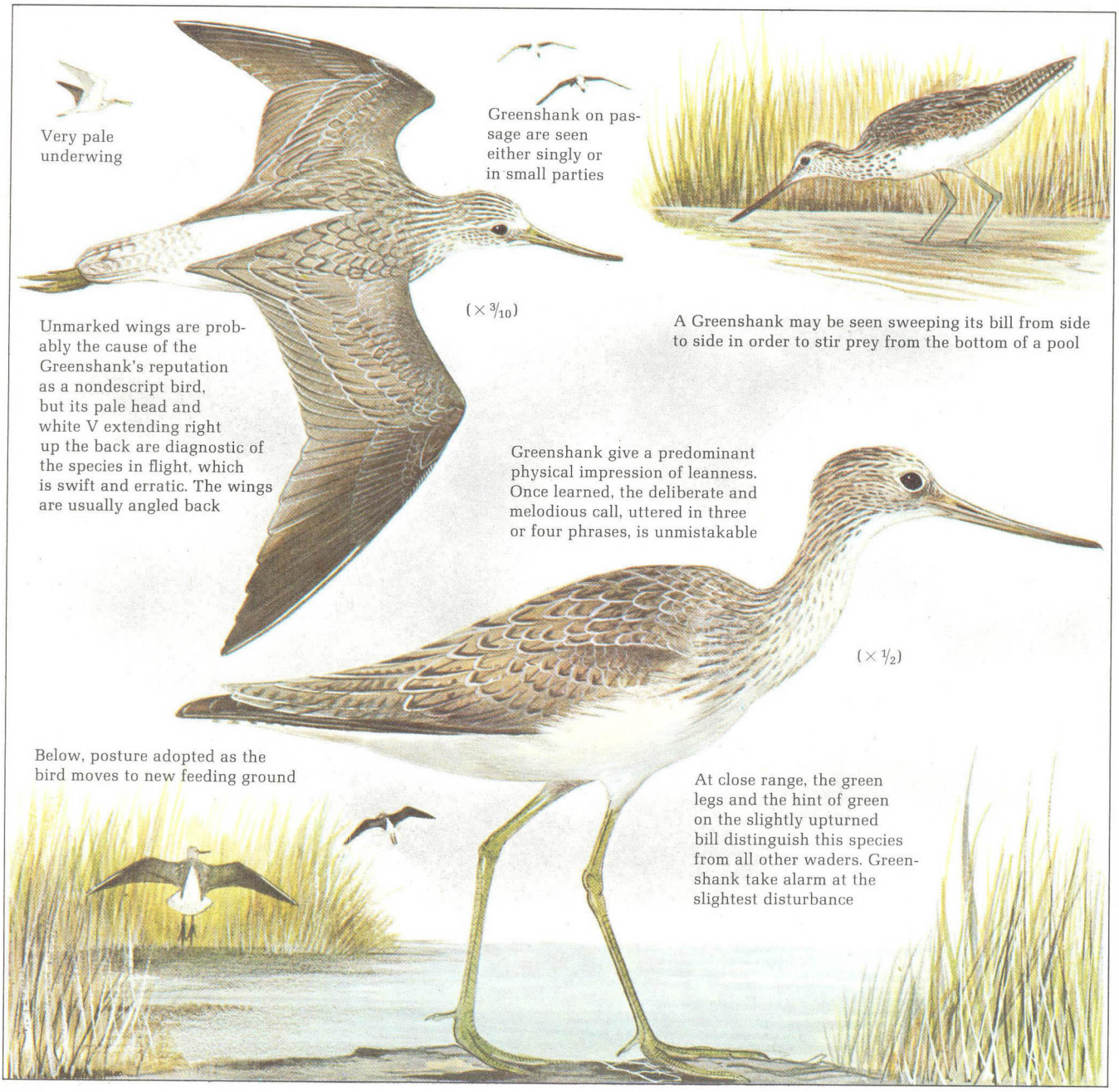


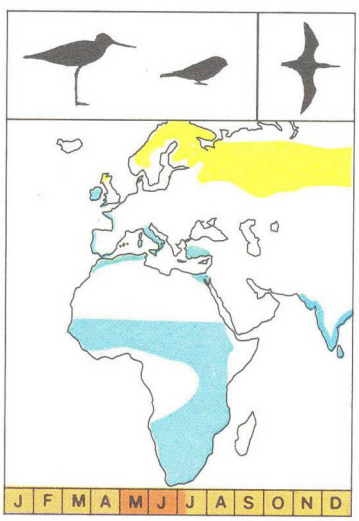


Coastal mudflats are the habitat of the Grey Plover, a shore-feeding counterpart of the Golden Plover. The black "armpit" patch immediately distinguishes the Grey Plover in flight, as does the clear three-syllabled call – one of the most distinctive of all bird sounds. The Grey Plover is a more heavily built bird than the Golden Plover, and adopts a hunched posture – even on its infrequent feeding visits to fields, where a Golden Plover, with its upright stance, has a much better view over grass or stubble. On the shore, the longer, heavier bill of the Grey Plover enables it to take prey inaccessible to Golden Plovers, such as ragworms, which are excavated with sideways flicks of the bill. Crabs are a major food until they move into deeper water for the winter. Small molluscs are taken in quantity.

The Grey Plover is a high Arctic breeder and undertakes much more extensive migrations than the Golden Plover. European birds come from the populations breeding in Russia and Siberia. They migrate through the Baltic, and many continue via European coasts to winter on African shores as far away as Cape Province. Breeding habits resemble those of the Golden Plover: both have a similar song and "butterfly" display flight. The nest is a simple scrape amongst stones and lichen, where four eggs are laid at the end of June. The adults are extremely bold in defence of the young, which fledge in late August.

Greenshank

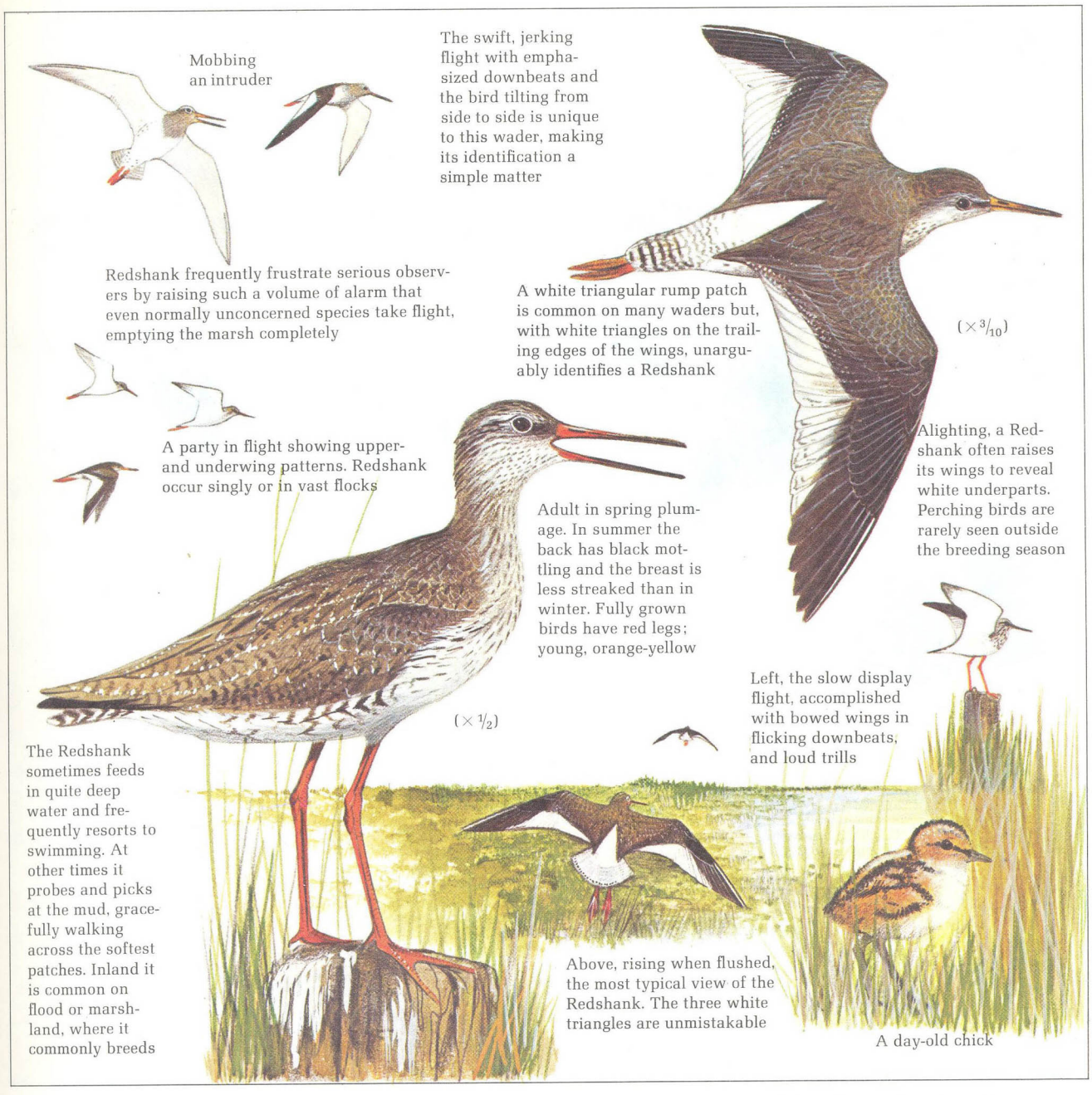


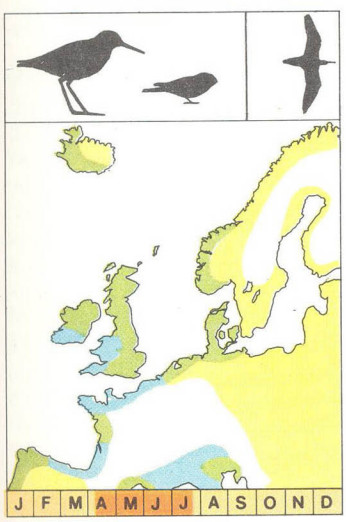


Though it is undistinguished in plumage, the Greenshank's habits and life history are as interesting as any among the waders. It breeds in northern Europe and Asia on dry moorland or on boggy areas in tundra or forest clearings. From here it undertakes an extensive migration to winter on coasts anywhere from the Mediterranean to South Africa, or, for more easterly populations, southern Asia and Australasia. The bird is therefore seen mainly as a passage migrant in western Europe, feeding on mudflats, salt-marshes or fresh marsh pools. It is an active and nimble feeder, catching such prey as crustaceans and small fish in shallow water. It often makes rapid dashes to seize prey, and occasionally breaks into an astonishing, high-stepping dance, which is thought to stir prey into movement, thus revealing themselves. On the breeding grounds, water insects—especially beetles and water boatmen—are the main prey, but fish, newts and frogs may be snapped up.

The nest of the Greenshank is situated amid huge tracts of relatively featureless ground, and to find one is a major achievement in fieldcraft. This challenge, paradoxically, has made the Greenshank's breeding biology better known than many more common waders. Its rich song is uttered in a "switchback" flight, and a wide variety of displays is used in courtship. The eggs hatch in 24 to 25 days, and fledging takes about four weeks.

Redshank



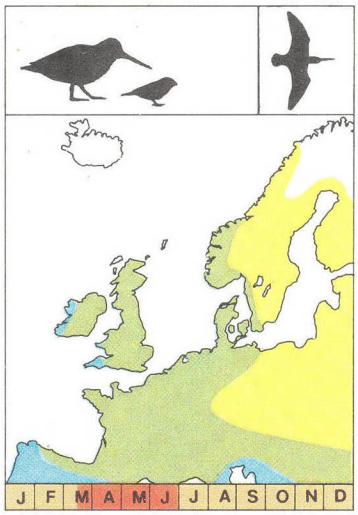


Rising with hysterical calls from a creek or pool at the approach of Man, the Redshank has aptly been called the sentinel of the marshes.

During autumn and spring its main feeding area is open mudflats, where it specializes in taking a tiny crustacean (*Corophium*) which lives in burrows in mud. Generally, these creatures lie near the surface, and are seized with brief pecks as the bird strides briskly over the mud: up to 100 pecks may be made per minute. Sight is the important sense for this type of hunting, but an alternative method, in which the bill is swept from side to side across the mud, seems to rely on touch, and is important at night. Studies show that a mud temperature below 37°F prevents the *Corophium* from showing themselves, and when this occurs the Redshank switches to other prey, such as ragworms and molluscs, or visits inland fields to take earthworms and leatherjackets. Redshank regularly feed inland in many areas, especially in the breeding season, when meadows near water are favoured.

Courtship includes a display flight performed with rapid, shallow wing beats, sometimes by several birds together. The nest is a lined scrape, well hidden under a grass tussock or saltmarsh plants, usually with a definite side entrance. Both sexes incubate, sitting very tightly when approached. The four eggs hatch in 21 to 25 days, and the young fledge after four weeks.

Woodcock

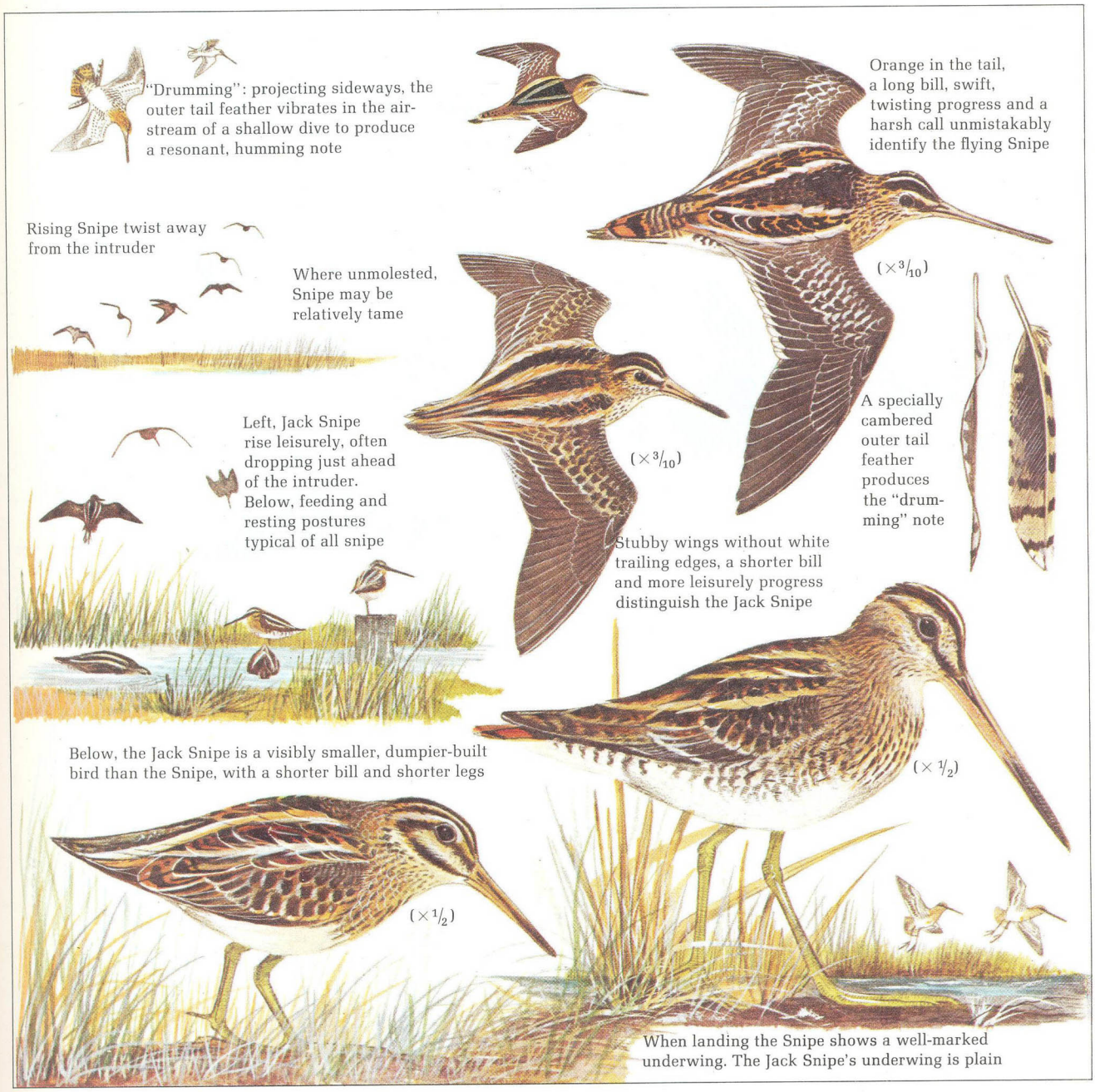


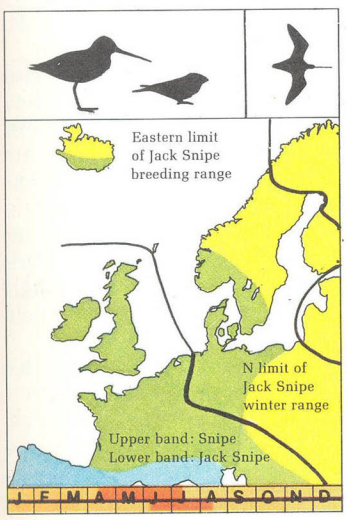
"For fools are known by looking wise, as men find Woodcock by their eyes." Such a feat of fieldcraft is beyond most people's ability, but it is undoubtedly true that Woodcock have very large eyes—an important feature in a largely nocturnal bird. Moreover, these eyes have a greater field of view behind the head than in front, providing early warning of danger while the bird is probing.

Prey is found mainly by means of the sensitive bill tip, and the capacity for raising the tip of the upper mandible, which many waders possess, is particularly highly developed in Woodcock and snipe, enabling them to grasp prey underground without the problem of opening the entire bill. The food itself is earthworms and insect larvae, found in moist places in woodland.

During the breeding season, male Woodcock perform a display flight known as roding. This takes place in the evening, and is a flight on a regular circuit, sometimes of several miles. The wing beats are characteristically slow, with intermittent pauses coinciding with a low croaking call. The nest is a scrape in the ground, often near the foot of a tree, with a clutch usually of four eggs. They are incubated by the female for 20 to 21 days, and the female tends the young, which fly after two and a half weeks. There is good evidence that females occasionally move their chicks by flying with them grasped between their thighs.

Snipe–Jack Snipe





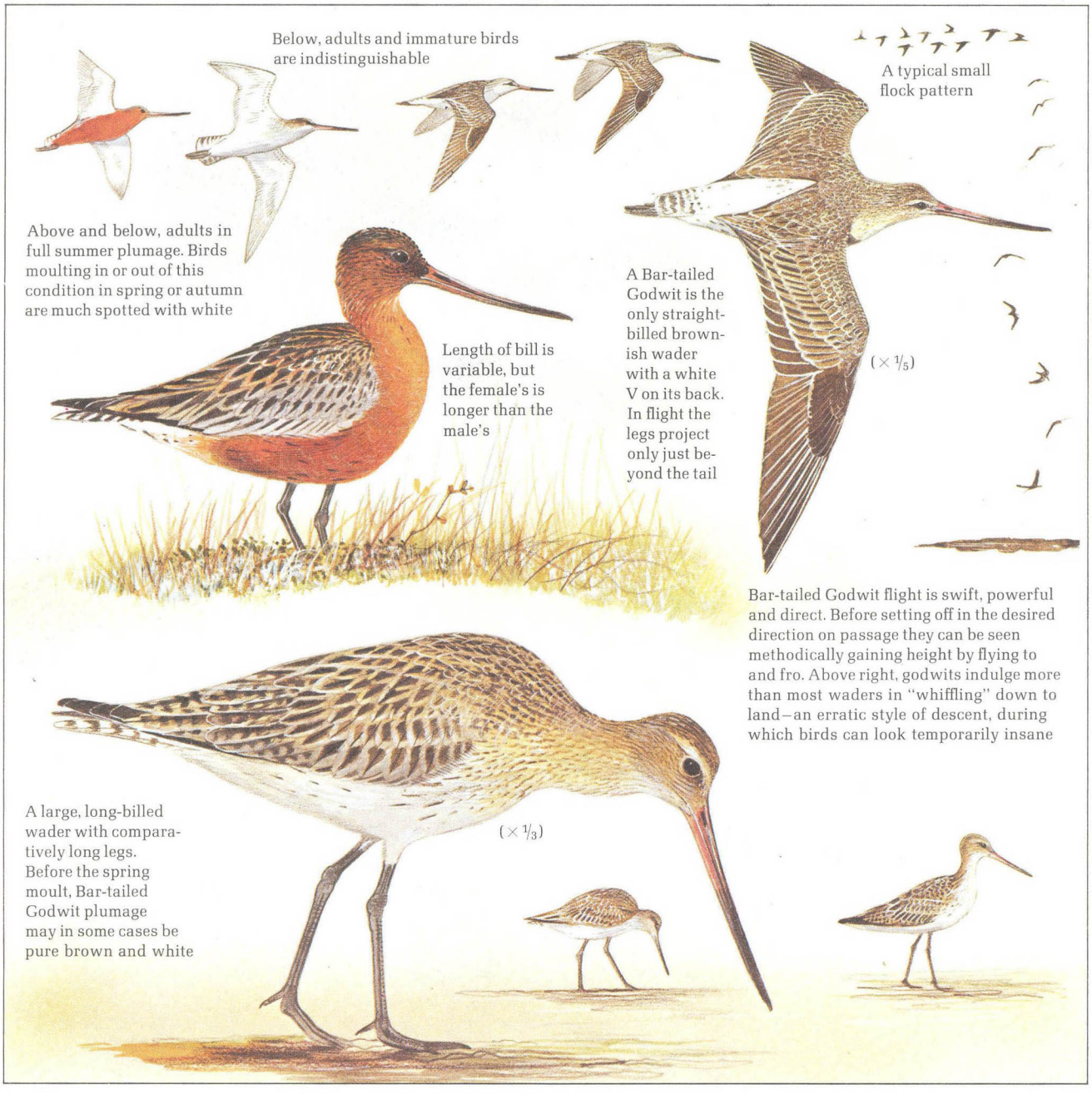
Zigzag flight must be an effective defence against the falcons or other winged predators which occasionally attack Snipe. Man, perversely enough, finds rising Snipe all the more attractive targets because they are so difficult to kill with a shotgun.

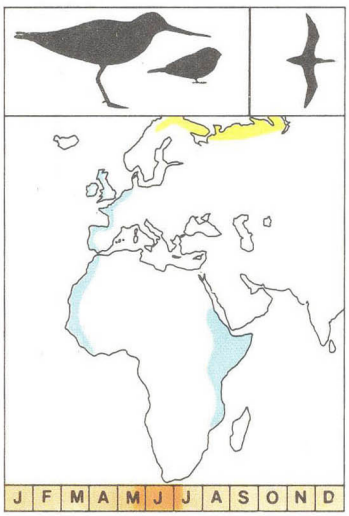
Their feeding methods make an interesting contrast with the Curlew's: they search in soft mud with straight probes, but indulge in none of the Curlew's vigorous contortions. Consequently, the bill needs less reinforcement, and there is room for a long tongue. By this means, many worms and insect larvae are drawn far up the bill even before it is removed from the ground. A small proportion of seeds is also taken. Snipe feed most actively at night, flighting to their feeding areas at dusk.

The "drumming" display flight is first heard in early spring over the wet woodlands or water meadows where the bird breeds. The nest is a simple scrape in a tussock with the usual wader clutch of four. The female incubates alone for 20 days, but both parents look after the chicks, which fledge in 18 or 19 days. Two broods are sometimes reared.

The Jack Snipe, a smaller bird, is a more northerly breeder than the Common Snipe, and though the two species associate together outside the breeding season, the Jack Snipe is never so numerous. Its feeding habits are generally similar.

Bar-tailed Godwit



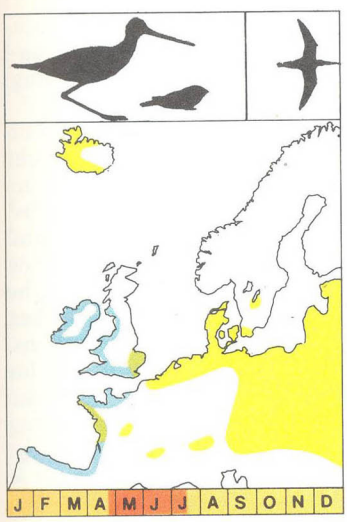


A feeding flock of Bar-tailed Godwits is an entertaining spectacle. Walking briskly across the mud, brief trial probes are made at frequent intervals, and when the sensitive bill tip detects prey, the bird continues walking without breaking step, but around its bill instead of straight on. This drives the bill deep into the mud to capture a worm or small bivalve mollusc. Occasionally, also, the birds will run in pursuit of visually located prey. Bar-tailed Godwits prefer to feed in firm, rather sandy mud, usually keeping well away from the tideline, unlike the longer-legged Black-tailed Godwits, which regularly wade in deep water. Though the birds feed in well-spread-out groups, they congregate in dense flocks at high-tide roosts. Single birds, or pairs, may also be encountered.

During winter, Bar-tailed Godwits have colouring similar to the Curlew and resemble them when in flight, but the godwit can be distinguished by its quicker wing beats even if the bill cannot be seen. These birds have a curious habit—shared, oddly enough, with the entirely unrelated grey geese—of suddenly losing height by plunging through the air in wild twisting dives. Their call is a wheezing squeak.

The Bar-tailed Godwit breeds in the Arctic, favouring marshy tundra with a scattering of dwarf willow or birch scrub. The nest is made on a dry hillock and the four eggs are incubated principally by the male.

Black-tailed Godwit

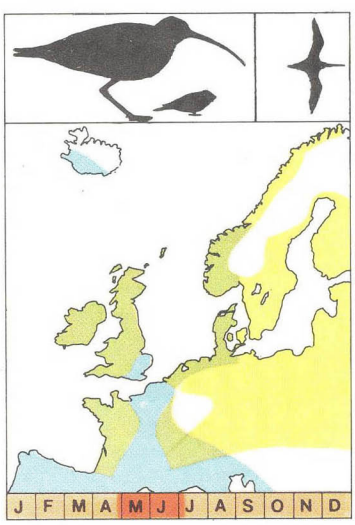


Soft, treacherous mud, where men venture at their own risk, is the feeding ground of the handsome Black-tailed Godwit. It is a longer-legged bird than the Bar-tailed Godwit, and can therefore venture into deeper water. While feeding, Black-tailed Godwits move less hurriedly than Bar-tailed, and hunt more by touch, spending much of their time in long series of trial probes. Worms and molluscs are taken on the shore; insect larvae and such surface prey as grasshoppers, flies and beetles are taken inland. Seeds and berries are occasionally eaten on migration.

While on passage, the Black-tailed Godwit occurs inland more often than the Bar-tailed Godwit, and is a more southerly breeder, nesting in suitable areas of western Europe. It has recently returned to Britain as a regular breeder after more than a century.

The breeding habitat is fens or swampy grasslands inland. Laying commences in late April, and the nest, consisting of a thick pad of dead grass and sometimes down, is made in a hollow amongst rough grass. Normally there are four eggs in the clutch, and with the third or fourth, incubation commences. This lasts 24 days, and the male takes the main share of brooding. The young fledge after four to five weeks. Western European breeders migrate largely to central Africa; farther east, populations move to the Middle East and India. Many birds also winter in Britain, Ireland and France.

Curlew

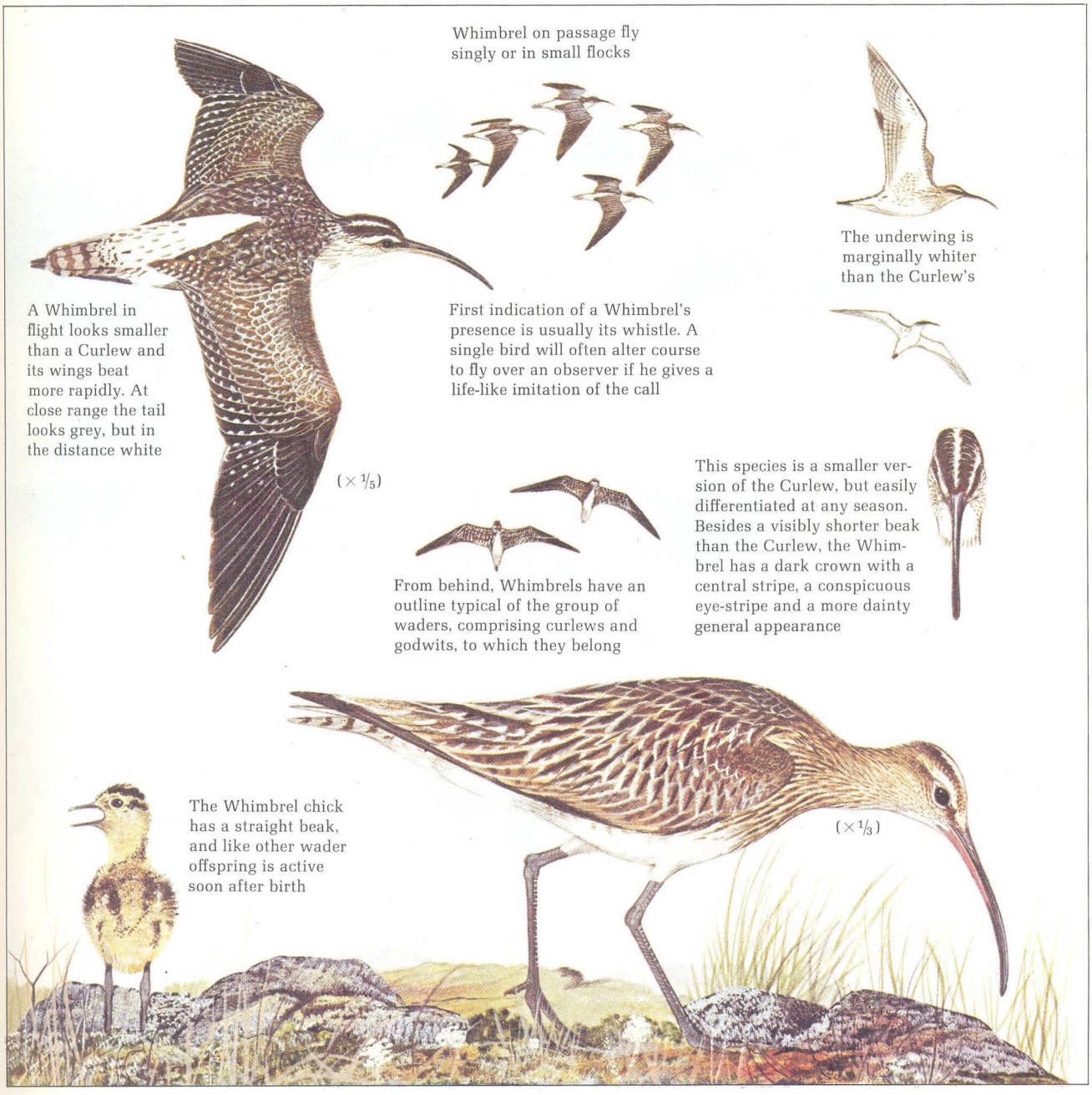


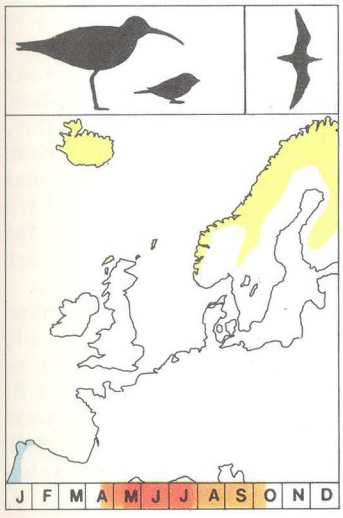
Stalking sedately across the mudflats of an estuary, a foraging Curlew presents an interesting contrast to the restless energy of the smaller waders. It hunts both by touch and sight, making frequent shallow probes by which the sensitive bill tip can detect subterranean animals, or locating them by such clues as surface holes and tracks. They are then extracted, often piecemeal, by deep and vigorous probes, the decurved bill shape aiding exploration underground. Ragworms and small bivalve molluscs are taken in this way on the shore, earthworms and leatherjackets on moorlands or pasture. Much surface prey is also taken.

The impression of sedateness is dispelled when a Curlew calls: its voice has a haunting quality, vividly evocative of the wild places it inhabits—moorlands or bogs when breeding, coastal flats in winter.

Most Curlews pair before arrival on the breeding grounds and are thought to return to the same territory in successive years. The territory is defended with boundary-marking flights and occasionally fighting. The nest hollow is selected from several made by the male amongst rough grass, and is then lined by both parents with grass stems. Four eggs are laid, and incubated for four weeks by both parents, who change places twice daily. The young fledge after six or seven weeks, but the bill does not reach full length for a further 12 weeks.

Whimbrel

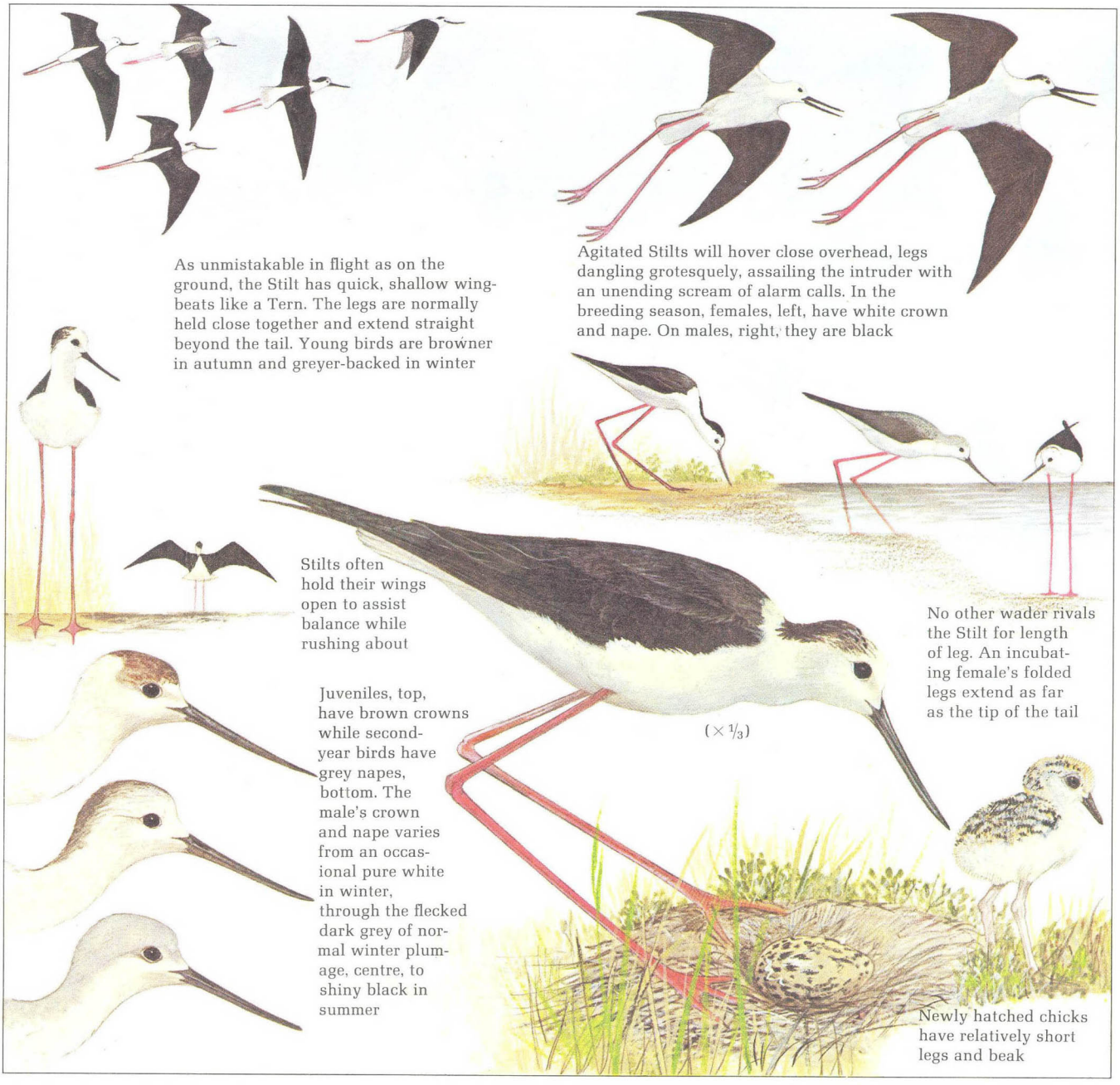


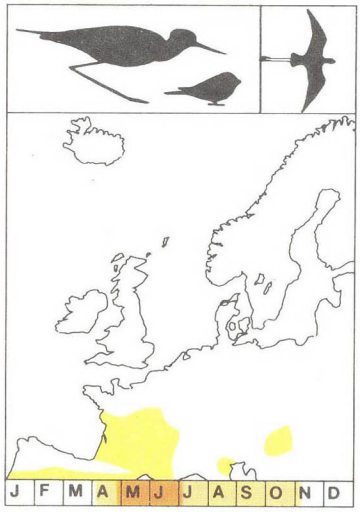


Tiny specks high in the sky, parties of migrating Whimbrel would often pass over unnoticed were it not for the call—a rapid series of whistles, descending in pitch, and usually seven in number. Heard in bleak surroundings, the call has an eerie quality, and in parts of Britain Whimbrel are called the "seven whistlers", with superstitious connotations. Seen at close range the bird is a smaller edition of the Curlew, but the bill is much shorter, though equally down-curved. Its feeding behaviour is similar, but the desultory trial probes of the Curlew are replaced by test jabs made close together in rapid sequence, somewhat resembling the technique of such small waders as Dunlin. Choice of habitat is rather wider than the Curlew's, with an apparently greater liking for rocky shores. Coral reefs are favoured in some of the wintering areas. Prey taken includes molluscs, worms and crabs.

The breeding habitat is usually treeless moorland or tundra. Display flights commence soon after arrival and consist of a long spiral climb followed by a gliding descent, sometimes varied with aerobatics. The accompanying song is a bubbling trill similar to that of the Curlew. Female often joins male in both the flight and the song. The nest is a depression, usually on a hummock giving a good view of the surrounding terrain. Both sexes incubate for 27 to 28 days, and the young are fledged in four weeks.

Black-winged Stilt



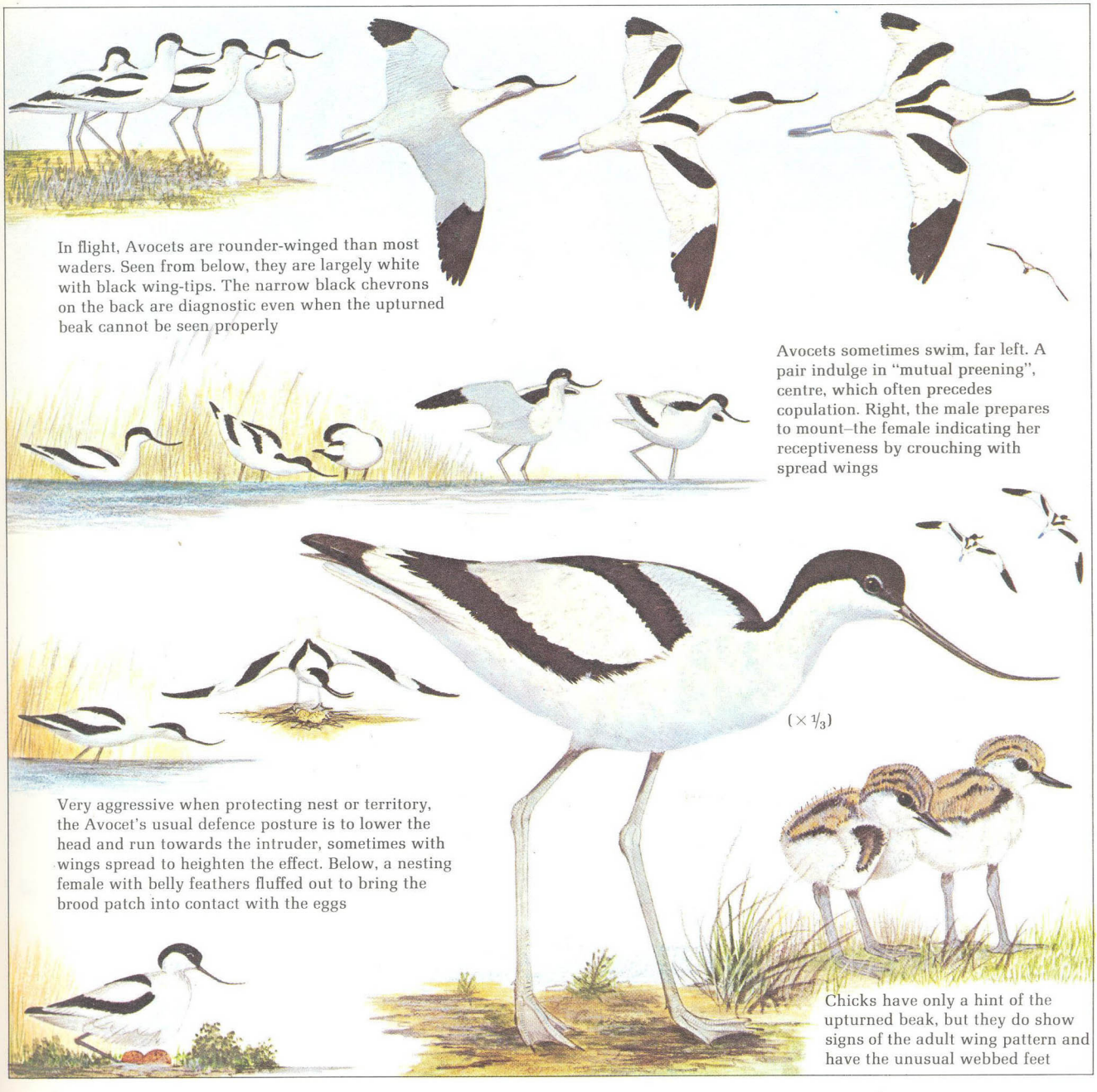


A rare visitor to northern Europe, the Black-winged Stilt is more widespread around the Mediterranean, where it is a characteristic bird of open marshland, lagoons and saltpans. It often occurs there in moderately large numbers, nesting in colonies on small islands or banks between saltpans. Individual pairs show considerable aggression, keeping up a fusillade of angry yelps.

Pink legs of quite extraordinary length and striking black and white plumage in all seasons make this one of the easiest birds to identify. Standing on mud, the legs may seem impractical as the Stilt half-crouches to take an insect or crustacean off the surface, or struggles to stay upright in a stiff breeze. The evolutionary benefits of feeding in deeper water than any other wader obviously offset this and Stilts are seen in their element pacing sedately in water nearly up to their bellies, where only the marsh terns are competitors for insects picked off the water surface with the delicate needle-sharp beak. Only rarely is the beak used for probing mud, though small fish are seized from the water.

The egg is typical in size and shape for a wader, but clearly the newly hatched chick, although able to run as soon as its down is dry, could not fit into a normal egg if legs and beak were of the same proportions as the adult. Thus, as it grows, beak and legs develop unusually quickly.

Avocet



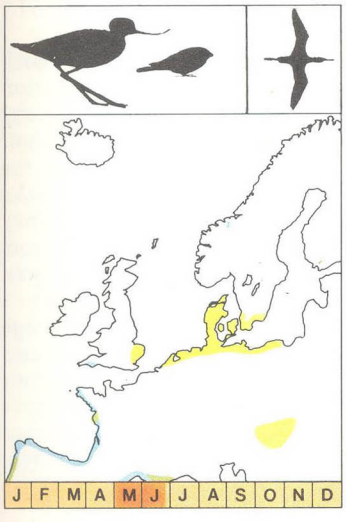
In flight, Avocets are rounder-winged than most waders. Seen from below, they are largely white with black wing-tips. The narrow black chevrons on the back are diagnostic even when the upturned beak cannot be seen properly

Avocets sometimes swim, far left. A pair indulge in "mutual preening", centre, which often precedes copulation. Right, the male prepares to mount–the female indicating her receptiveness by crouching with spread wings

(× 1/3)

Very aggressive when protecting nest or territory, the Avocet's usual defence posture is to lower the head and run towards the intruder, sometimes with wings spread to heighten the effect. Below, a nesting female with belly feathers fluffed out to bring the brood patch into contact with the eggs

Chicks have only a hint of the upturned beak, but they do show signs of the adult wing pattern and have the unusual webbed feet

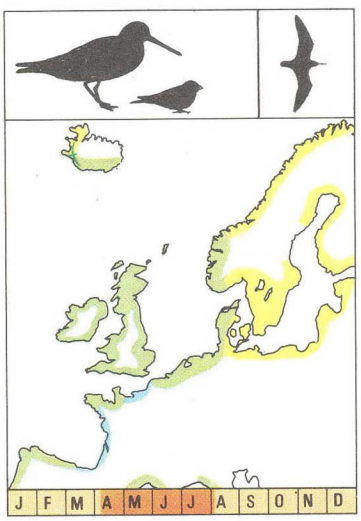


Avocets flying against a blue sky, melodious calls ringing over the marsh, are an enchanting spectacle. Surely the most beautiful wader, its name derives from the French *Avocat* (barrister), an allusion to the pied plumage. Related species in America and Australia have rufous colouring on head or neck.

The elegant upturned bill is a specialized feeding instrument. Small invertebrates are captured as the bird walks through water, sweeping the bill from side to side through the surface layers. It will also sweep the bottom mud, sometimes swimming and upending like a duck. Avocets nest colonially, choosing sites on open sand or mud near water. The small nesting territory is defended with a varied repertoire of displays and postures, but most commonly one in which the defender walks alongside the intruder, edging towards it. Pairs defending territories against neighbours display with legs flexed and heads lowered, often attracting other pairs. Pre-mating displays include bowing and bill-crossing. Nests vary from unlined scrapes to substantial platforms, the latter often a response to the threat of flooding. Four eggs are normally laid, in late April or early May in northern Europe. The chicks feed from birth, at first mainly by pecking, though sweeping begins while the bill is still quite short and nearly straight.

The Avocet colonies of eastern England date from 1947 (Avocets last bred here in 1842), and are now flourishing.

Oystercatcher



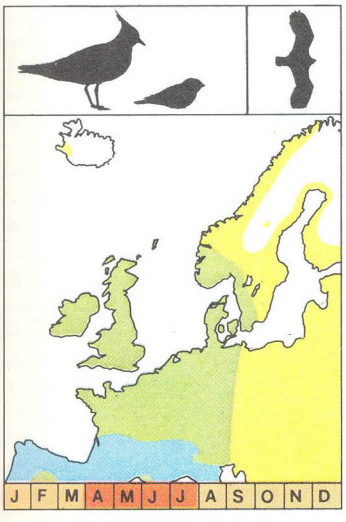
Twinkling black and white wings and the wild, piping calls of a flock of Oystercatchers lend enchantment to many seashores.

The bird's vivid orange bill is adapted for opening bivalve molluscs such as mussels and cockles, and it may be used either to hammer them open or to stab the muscle which closes the shell. Birds learn from their parents to follow one method or the other, but "hammerers" suffer bill deterioration, which may place them at a disadvantage when probing for worms on shore or pasture—an important alternative feeding method. The nest is a simple scrape, often near a sheltering piece of vegetation. A territory around it is defended by a display with neck upstretched and bill pointed down, accompanied by loud piping.

Three or four eggs are laid, which hatch after 24 to 27 days of incubation by both parents. The young are among the few waders which are fed by their parents, since the main foods of the species cannot be obtained by chicks with their undeveloped bills. They learn feeding techniques gradually from their parents, staying with them even after they can fly at about five weeks.

Oystercatchers first breed at the age of five (males) and four (females), and many birds apparently live into their twenties. Most Oystercatchers move south in winter, though long-distance movements are mainly limited to northern populations.

Lapwing

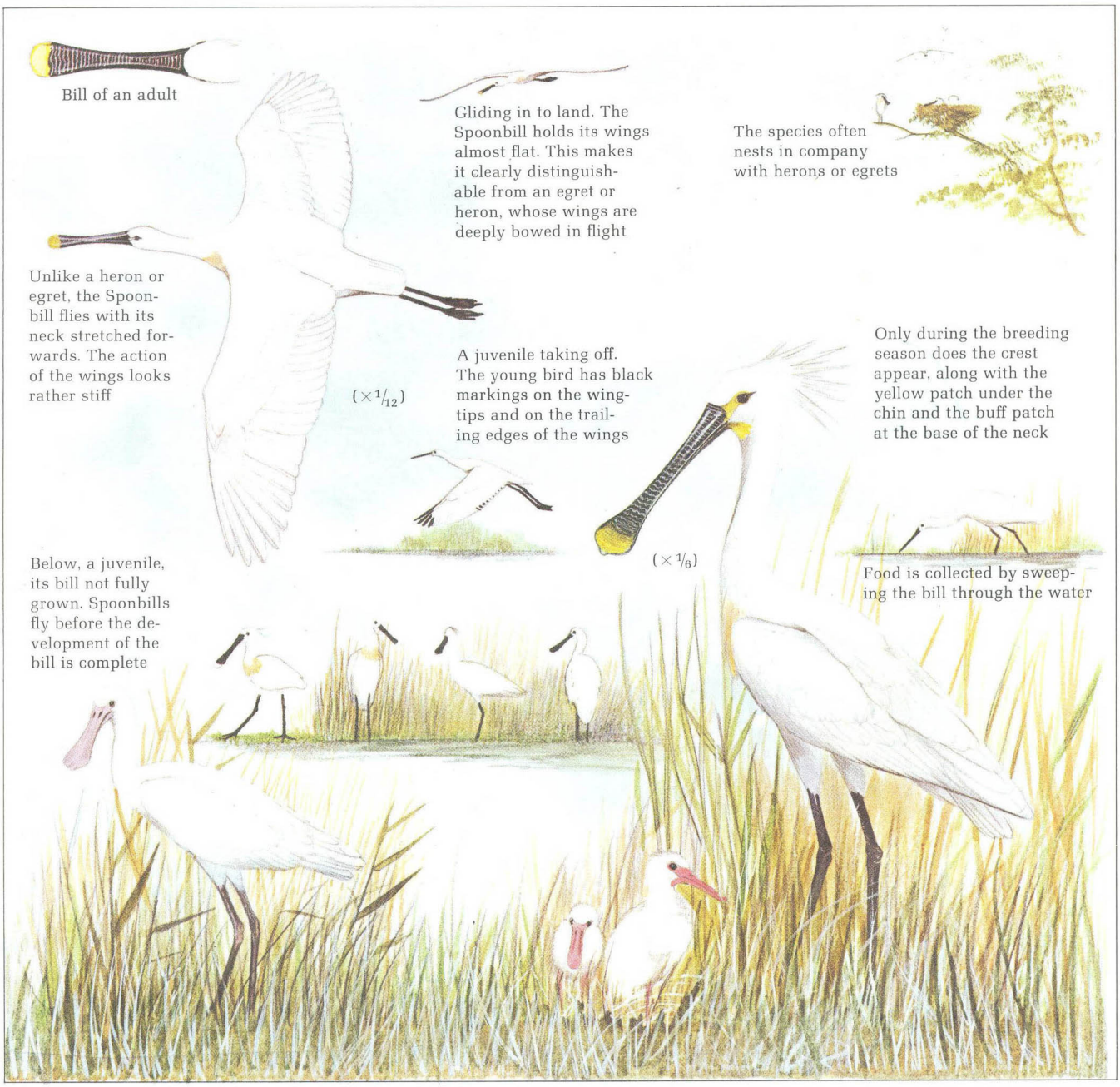


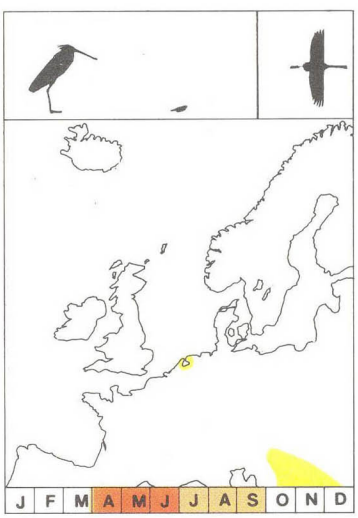
Mewing calls and the exuberant, tumbling display flight of the male Lapwing seem to capture perfectly the feeling of exhilaration that comes with the start of spring. This advertisement flight soon attracts a mate, to whom the male displays in an exaggerated version of the movements by which a nest scrape is made. The couple prospect likely sites together, and the female signifies her approval of one of them by returning the display. Mating follows, and the first egg is often laid in March. Both sexes incubate, though the female takes much the larger share.

The eggs hatch in 24 to 31 days, exact time taken appearing to vary with altitude. Soon after hatching, the young are led away from the dry, exposed nest site—a ploughed field is typical—to a damper area with grass to provide them with cover. They fledge in four and a half to five weeks.

Outside the breeding season, Lapwings feed on pasture and ploughed fields, using the typical plover tactic of repeatedly running a short distance, then pausing, sometimes to pounce on a victim—often an earthworm, leatherjacket or moth larva. Vigorous excavating movements are used to extract prey from the roots of grass tussocks. Foraging becomes difficult when fields are frozen, and in hard weather, movements of Lapwings may be on a large scale. Sometimes Lapwings heading south-west overshoot drastically and end up in North America.

Spoonbill



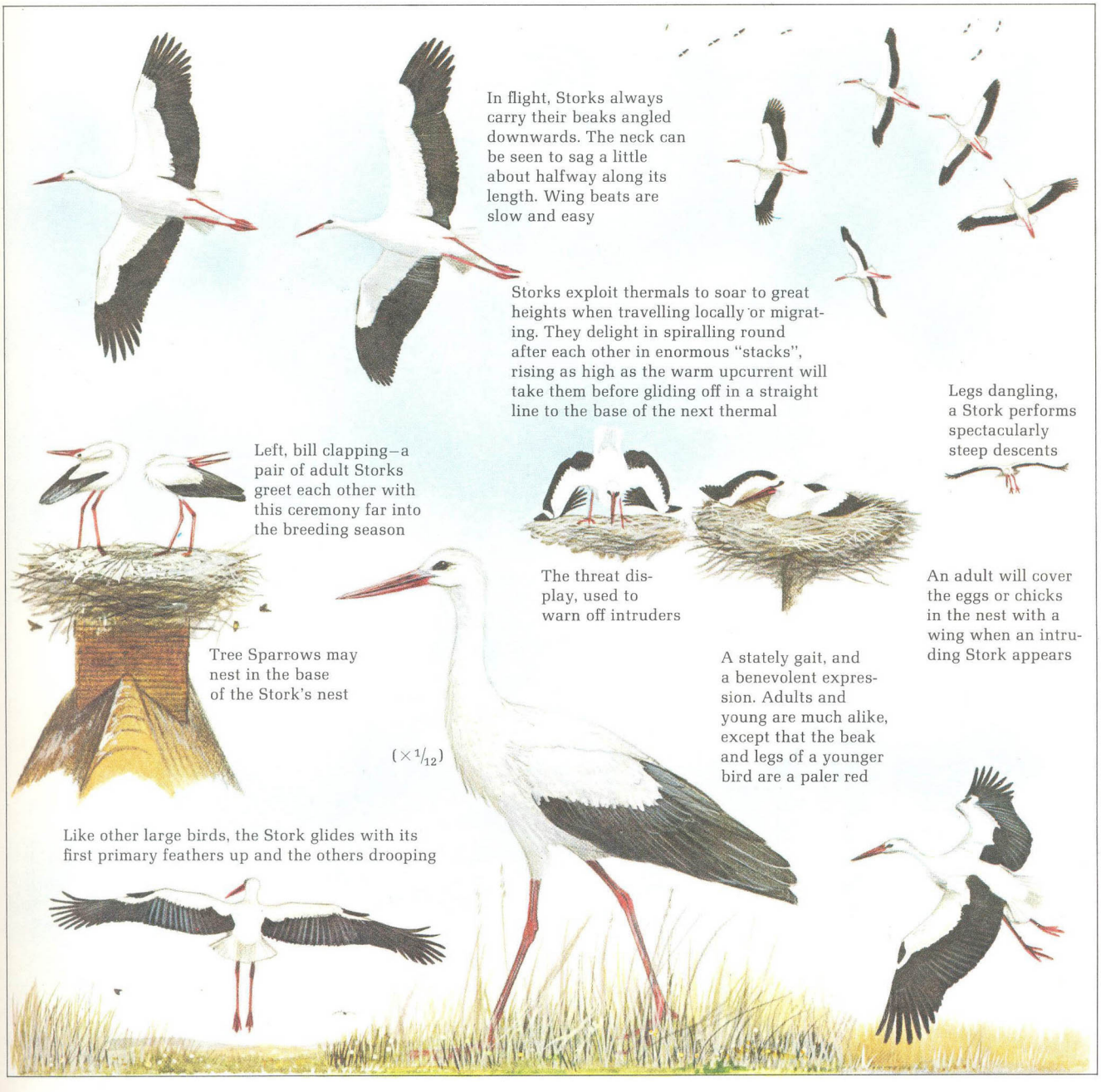


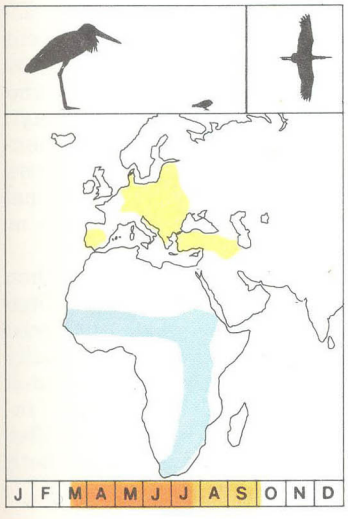
Spoonbills look beautiful and ridiculous, and, extraordinary though it may appear, the huge bill is an efficient feeding instrument: as it is swept from side to side in shallow water, numerous tiny crustaceans, fish, worms and molluscs are snapped up. Abundant nerve endings in the bill render it sensitive to the slightest touch or vibration, and probably most prey is detected by this means rather than by sight.

Breeding places must be near shallow lagoons suitable for feeding, and with continuing reclamation of wetlands these are becoming increasingly restricted. Nevertheless, the Spoonbill is showing a slight tendency to expand its range, perhaps as a result of protection, and there are hopes that it may eventually nest in the south of France or even eastern England, where it bred regularly until the mid-seventeenth century. Europe's most accessible breeding colonies are on the Naardermeer, outside Amsterdam.

The usual nest site is a reed-bed, but bushes are often used, and in some places nests are built quite high in trees. Little more than a platform of reeds and twigs, the nest usually holds a clutch of four eggs, laid at intervals of several days. Incubation and care of the young are shared by the parents, and the eggs hatch after three weeks to reveal chicks with short, almost normal bills and a sparse covering of white down. They may leave after as little as four weeks.

White Stork





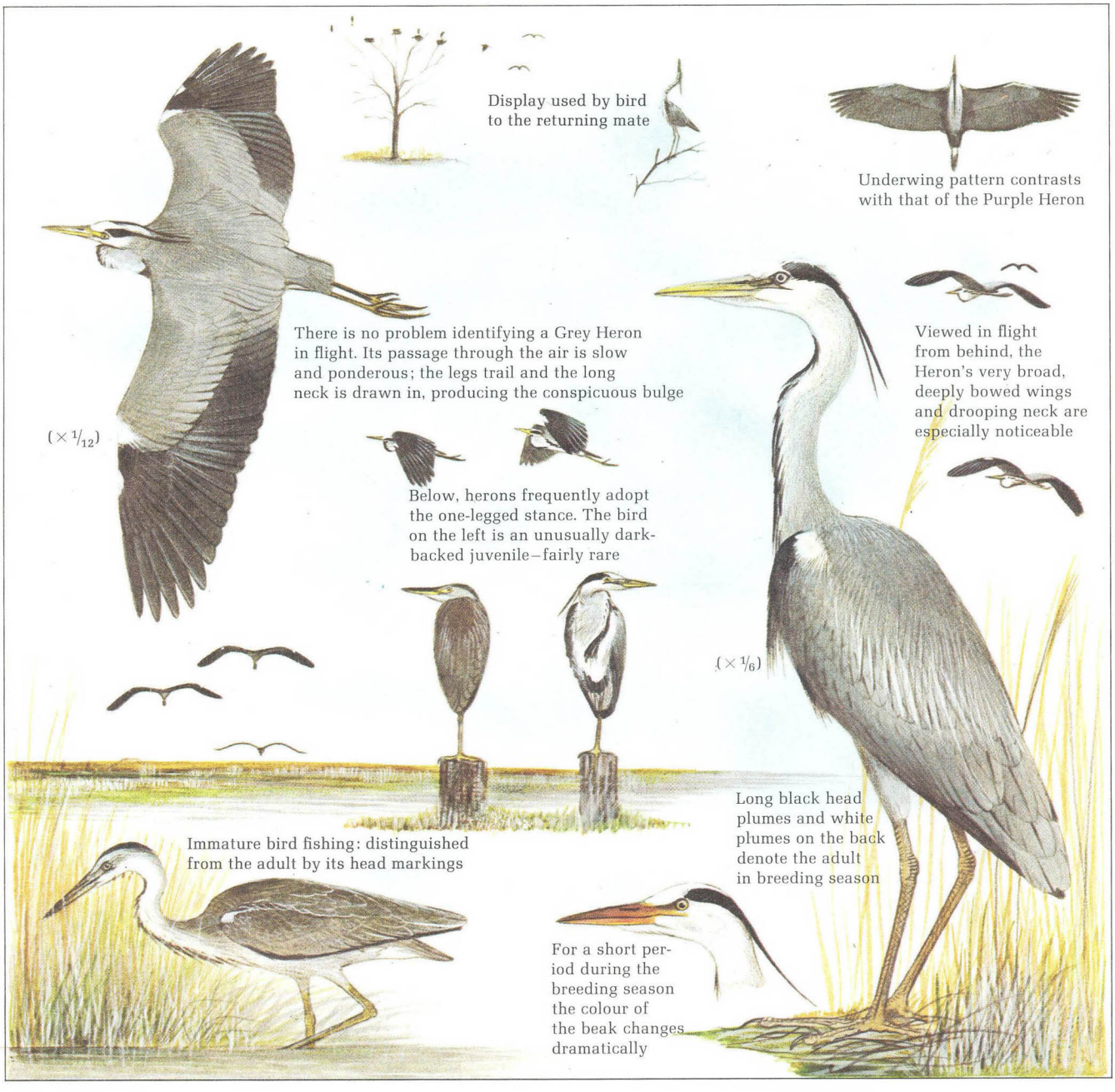
White Storks are surely the most conspicuous European birds, and since they also nest regularly on houses it is hardly surprising that their arrival is regarded as a significant event in the year. This strong association with rebirth no doubt underlies the Stork's role as a bringer of babies.

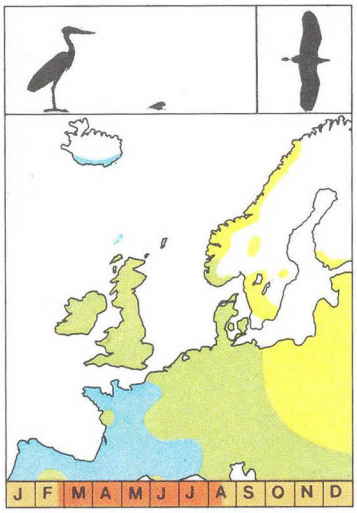
Despite the affection in which it is held, the bird's numbers in Europe are dwindling. It is strongly protected in most countries, and in some towns special nesting platforms are constructed. Direct persecution can therefore be ruled out. One cause of the decline may be the proliferation of modern buildings, but probably more serious is the use of insecticides in its African wintering areas. The chemicals are absorbed by consumption of its favoured foods, locusts and grasshoppers.

Around their breeding areas White Storks forage principally in damp, grassy places, feeding on frogs, small mammals and large insects. Their huge stick nests are used year after year. Males are the first to arrive, and advertise for mates from the nest with a bill-clattering display. Six to eight eggs are laid, and incubated for 29 to 30 days. The parents share the duties of incubating and caring for the young.

Dependence on thermals (which occur only over land) to assist progress on long journeys means that storks choose the shortest possible sea crossings—Gibraltar in the west, and the Bosporus in the east.

Grey Heron



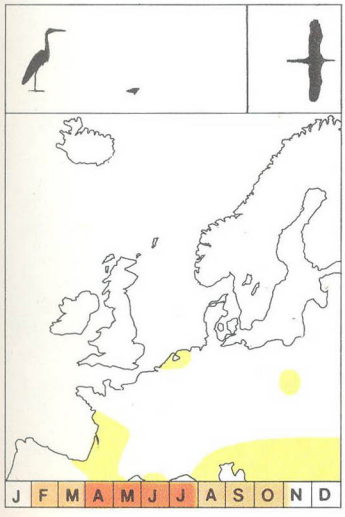


Standing gaunt and motionless in the shallows, a Heron can be mistaken for a dead branch or a post. Even when walking, its movements are so slow and stealthy that it easily escapes notice. Eventually a fish will pay the price of negligence as the Heron's kinked neck is straightened with startling speed and the sharp beak seizes its victim. Frogs, small mammals and young water birds are taken, but fish are the primary food and, because of this, the Heron is sometimes shot as a pest.

Despite some persecution, and loss of habitat due to drainage, the Heron still maintains sizeable populations in most European countries. Because most Heron nests are conspicuous structures in tree colonies, fairly accurate counts can be made. Recent figures show populations of over 5,000 pairs in Britain, the Netherlands and Germany (including East Germany); figures for most other European countries are less than 1,000. Hard winters cause marked decreases, but normal numbers may be regained in two or three years.

Most heronries consist of less than 200 occupied nests, though a Dutch colony, now extinct, once numbered 1,025 nests. The first egg is normally laid in March, and the normal clutch contains three to five. Both parents incubate and hatching takes place after 25 days. The young are fed by both parents.

Purple Heron



Thinner and more angular than its larger relative the Grey Heron, a Purple Heron can be reliably identified by shape, even in poor light when its colours are indiscernible.

It also differs from the Grey Heron in choice of habitat, normally nesting in dense reed-beds. However, in the breeding season, Purple Herons do feed around the small ponds and dykes also favoured by Grey Herons. Unfortunately, large reed-beds are becoming fewer as human activities encroach on wetlands, and the Purple Heron consequently has a patchy and diminishing distribution in Europe. The Purple Heron is less often seen in groups than the Grey Heron, and is more often silent, though it has a similar harsh call. It often remains active after dark.

Dead reeds are the main material for the nest, which is usually situated near water level, though occasionally higher in bushes. Although Purple Herons, like other herons, are colonial breeders, they build their nests in quite widely scattered groups. Four or five eggs are laid, and the nesting season is generally later than the Grey Heron's. Both sexes incubate, usually from the first egg, and hatching takes place in 24 to 28 days. The young fledge after six weeks and are independent after two months; a single brood is reared.

The main Purple Heron migration route passes over Tunisia, Sicily and Corsica, where in spring the birds are commonplace.

Birds of Fenland, Coast and Marsh

Of all bird habitats, the wetlands are the most seriously threatened. Over the centuries, Europe's marshes and fens have been progressively reclaimed for use in farming or for building, and the process still continues in many areas despite attempts at national and local control.

Only recently has the balance been slightly redressed in favour of birdlife by the creation of artificial waters such as reservoirs and gravel pits, but few of these provide the rich habitats found naturally. Some of the most valuable wetlands have been designated as nature reserves, but are still vulnerable to pollution and disturbance.

Wetlands harbour several bird groups, most having extremely skulking habits. Among them are warblers, crakes and rails, which enliven the reed-beds with a cacophony of chattering and squealing. Besides waterfowl, however, the various types of heron which predominate these two pages are the most characteristic wetland species.

Cattle Egret: more stocky than Little Egret, paler than Squacco. Feeds in fields with livestock (on which it perches). SW Spain, N Africa

(× 1/5)

Little Egret: slender build, pure white plumage, contrasting yellow feet and black legs. Once persecuted for the long plumes of breeding plumage. SW Spain, N Africa

(× 1/6)

(× 1/15)

Crane: distinguished from Heron in flight by outstretched neck. Breeds in Scandinavia, N and E Europe; migrates through Europe in majestic formations, calling loudly

(× 1/5)

Red-necked Grebe: resembles Great Crested but smaller and lacking pale eye-stripe in winter. Breeds in C and E Europe; winters on estuaries and coastal waters

Winter plumage in foreground

Squacco: smallest white European heron, appears buff at rest. Crest of long plumes in breeding season. S Europe and NW Africa

(× 1/15)

Flamingo: huge white bird with startlingly pink legs and large bill specially adapted for filter feeding. Breeds in S France, SW Spain in localized areas; winter range slightly extended, coastal, also winters NW Africa

(× 1/4)

Night Heron: adult identified by black cap, white underside, grey wings; young are dark with buff spotting. Hunched posture at rest. Mainly nocturnal in habit. Summer in Holland, S Europe, NW Africa

(× 1/8)

Little Bittern: tiny heron easily identified by pale wing-patch. Skulking habits, climbing about in reed-beds. Like Bittern, freezes when alarmed. Summer throughout mainland Europe south of Baltic

(× 1/9)

Bittern: large, brown skulking heron, spends much of its time in reed-beds. Plumage provides superb camouflage when bird freezes in upright posture. Present and breeding throughout Europe and NW Africa; summer only in S Sweden, E Europe

Red-throated Diver

Red-throated Diver, winter plumage. The upperparts look grey when the bird is in motion. Size, shape and upturned beak identify the species

Divers in flight have a very characteristic appearance, mainly the effect of the long, sagging neck, but also of the very long, narrow wings, long, thin body and feet trailing far behind. Adult and immature birds look similar

(× 1/7)

On passage, a diver may fly quite high over the sea – 200 to 300 feet – making identification difficult except non-specifically as a diver

An adult Black-throated Diver in winter plumage. This is a larger bird than the Red-throated Diver, with heavier wings and beak

Red-throated Diver, winter. On a dull day the upperparts can look very dark

Red-throated Diver in winter revealing the white underwing

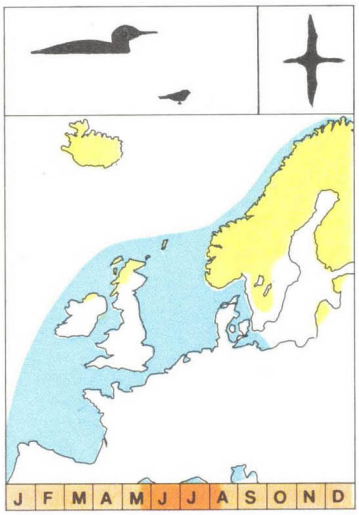
Above, diver flight is usually low over the sea and looks hurried. Below, when swimming, divers look broad-bodied, and float low in the water

(× 1/5)

Seen at close range, a Red-throated Diver in winter plumage has upperparts faintly spotted with white, and an eye-catching white throat

Divers may roll over to reveal the large expanse of clean white plumage of their underparts. While swimming, the head is either held aloft or else, when fish are sought, beneath the surface. After feeding, the birds take sips at the water

The Red-throated Diver's red throat is seen only on breeding plumage, worn between April and September



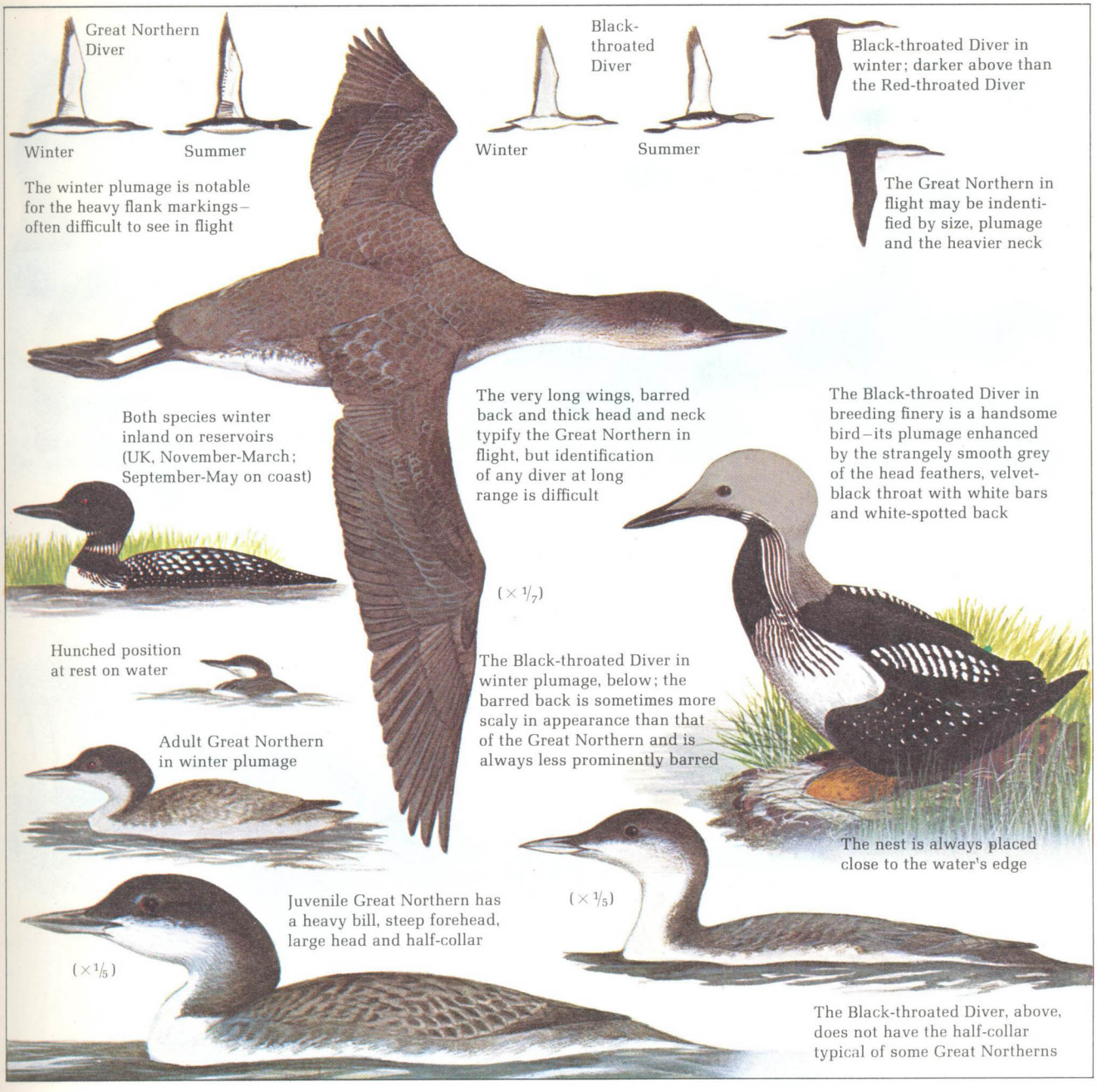
Although not closely related, divers and grebes share many physical specializations for swimming above and under water. Particularly striking in both groups is the position of the legs, which are set far back along the body. This provides efficient propulsion in the water but renders the bird hopelessly clumsy on land.

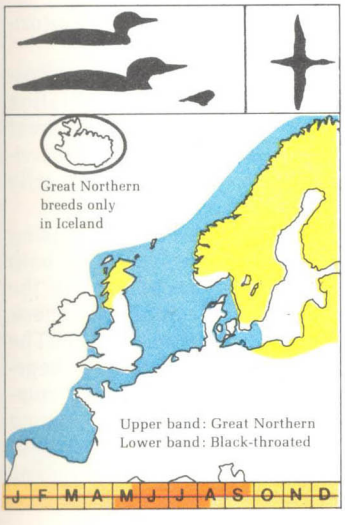
Commonest and most widely distributed of the divers is the Red-throated, which is also the smallest in size. During the breeding season it frequents lakes amongst tundra or moorland, and although some quite small stretches of water are chosen for nesting they are always close to the sea or a large lake, where the birds can fish.

Divers are noisy on their breeding grounds and in Scotland, the mewing and growling calls of this species are said to foretell rain. Displays may be seen throughout the summer: they involve dives, chases and posturing on the water by up to five birds at a time. A courtship flight, rising to tremendous heights and accompanied by cackling, is seen only before brooding commences.

Varying from a simple scrape by the shore to a substantial heap of vegetation in shallow water, the nest usually holds two eggs. Like those of all divers they are unusually elongated. Nest building, brooding and care of the young are tasks shared by both sexes. Incubation starts with the first egg and lasts 24 to 29 days.

Great Northern–Black-throated Divers

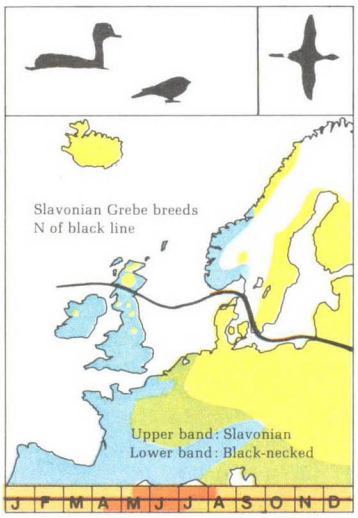




Scotland and Scandinavia harbour a regular breeding population of Black-throated Divers, but the Great Northern Diver had until recently been seen only in winter or on passage on European coasts or inland waters. In 1970, a pair of Great Northerns with two young were seen on a Scottish loch, and the following year at the same place a Black-throated Diver was seen with a hybrid Great Northern/Black-throated Diver and a well-grown chick. Though there have been no further breeding records, these occurrences raise the hope that the Great Northern Diver may eventually establish itself as a breeding species in Britain. Such an event would be most welcome, for divers have had to face severe pressure from mankind. Great Northern Divers are hunted for their plumage during summer, while the Black-throated's nests are sometimes destroyed by fishermen fearing the bird's impact on trout stocks. Moreover, all divers face a grave threat from oil pollution during their winter sojourn on the open seas.

The breeding behaviour of both species is generally similar to that of the Red-throated Diver, although incubation and fledging periods are a little longer, and neither of them is prepared to nest by such small sheets of water as the Red-throated Diver. Both are highly vocal during the summer, and the long-drawn, trembling wail of the Great Northern Diver is one of the most stirring of all bird sounds.

Black-necked–Slavonian Grebes

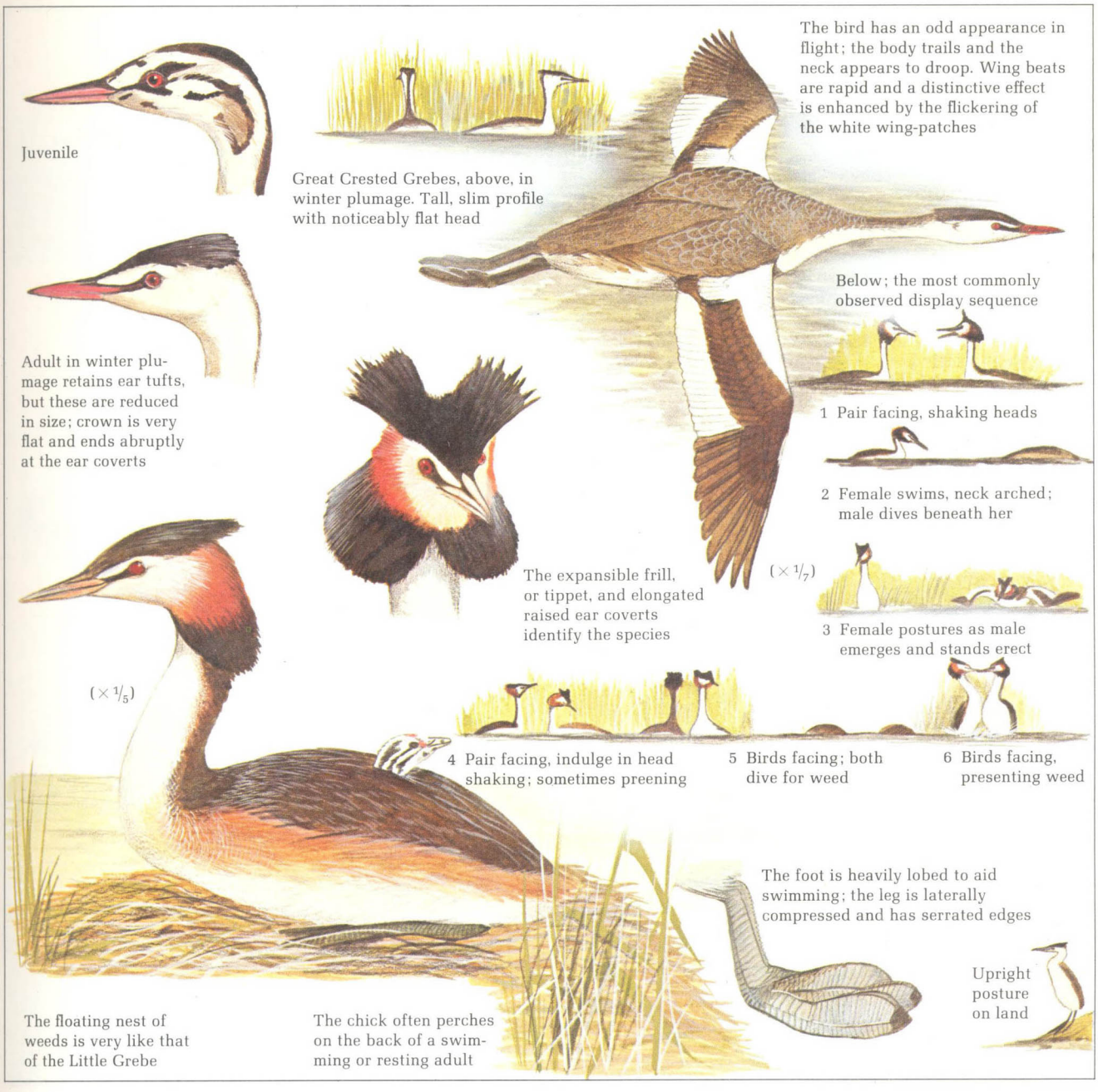


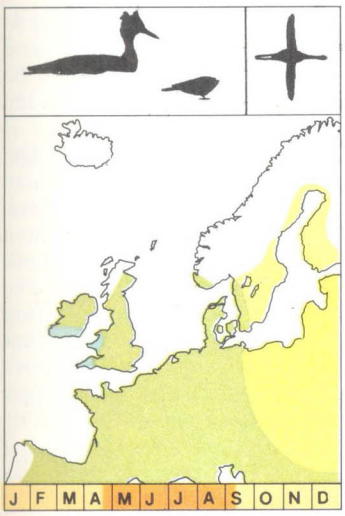
Both of these beautiful small grebes are widely distributed through the New and Old Worlds, their ranges overlapping extensively, although in Europe the Slavonian Grebe is generally a more northerly breeder. In summer, the Slavonian inhabits lakes or ponds with substantial areas of open water in addition to a well-vegetated fringe, while the Black-necked Grebe occurs on more densely overgrown swamps and meres. During the winter, the Slavonian frequents estuaries, but the Black-necked is usually seen on inland water, particularly reservoirs. Fish appear to be a more important item in the diet of the Black-necked Grebe, and in its winter quarters at least, it is the most assiduous and energetic diver of all European members of its notoriously submarine family.

In their breeding biology, these species show rather more differentiation of male and female roles than the Great Crested and Little Grebes, and territorial defence appears to be primarily the male's task.

Courtship displays involve raising and expanding the ear tufts by both sexes and the female responds to the male's advances by stretching the neck forward along the water or the nest. The nests are floating heaps of soggy vegetation. Both species tend to breed colonially, sometimes congregating among colonies of gulls and terns, whose fierce reactions to intruders offer some protection.

Great Crested Grebe





At a time when wildlife seems to be under pressure from every side, some reassurance can be gained by considering the change in attitudes which has taken place over the past 100 years in most countries of Europe. Today, the Great Crested Grebe is well known for its beautiful and intricate courtship ceremonies, but during the nineteenth century it was regarded simply as a source of millinery decoration. Intensive hunting gravely reduced its numbers, but it was saved in time by legal protection and changing fashions. Nowadays, as industrial activities create new lakes in abandoned gravel pits, it is actually increasing.

Courtship is principally confined to the early stages of the breeding cycle, before laying commences. Since first clutches may be laid at the end of February, this phase of behaviour may sometimes be observed as early as mid-winter. The displays are notable not only for their variety but also for their self-exhausting nature–that is, each may be complete in itself, rather than leading on to another more intense display. Another feature of interest is that both sexes take a nearly equal part in display, although the "trumpeting" performance in which one bird seeks the attention of another by vocal means is mainly used by females. Both sexes incubate the three to six eggs on a floating nest of rotting vegetation anchored to reeds near the water's edge. Two or three broods are raised.

Water Rail

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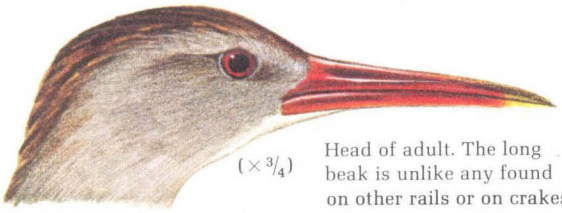
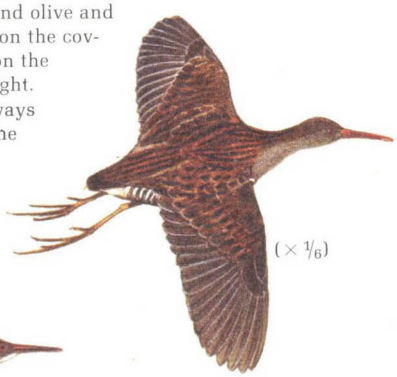


(× 3/4)

Head of adult. The long beak is unlike any found on other rails or on crakes

Greyish wings and olive and black streaking on the coverts are visible on the Water Rail in flight. The legs are always dangled while the bird is in flight



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There is quite pronounced white marking on the underwing and belly, but such details are rarely seen because the bird is almost always observed at low level after being flushed

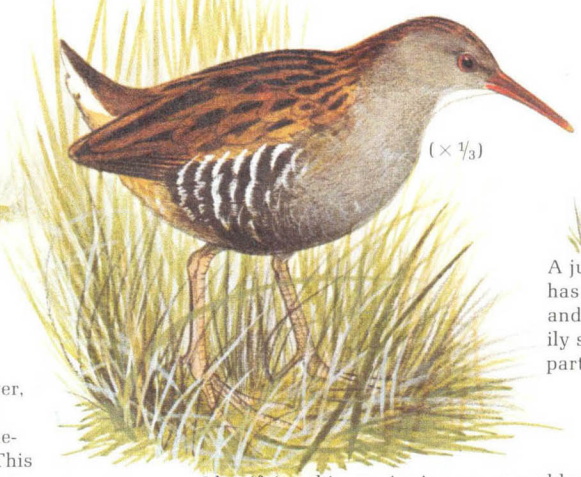
The most usual view of a Water Rail, below, as it takes to the air after being flushed. Alternatively, it may run for cover. Flight, although appearing weak, is strong. Water Rails are frequently brought down by accident during shoots

Long-necked appearance of bird standing upright

Feeding posture

Creeping into cover, left, a Water Rail reveals an extremely narrow body. This lateral compression enables the bird to pass between narrow gaps in the herbage

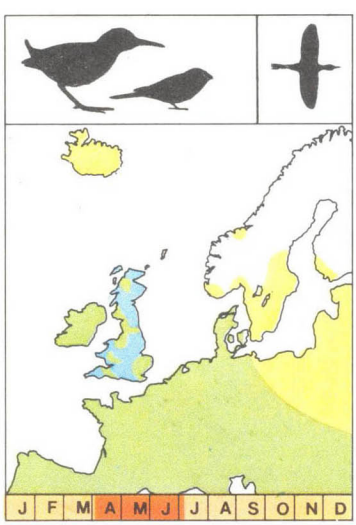
Conspicuous cream-coloured under-tail coverts are revealed as the bird cocks its tail



(× 1/3)

A juvenile Water Rail has a yellowish beak and whiter, more heavily streaked underparts than an adult

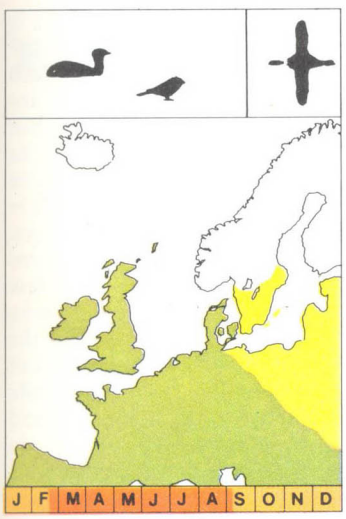
Identifying this species is never a problem because no other wader of comparative size or shape has such a long red beak. Additional, and easily seen, points of recognition are the grey underparts and barred flanks. It is a bird of contrasting moods, feeding unconcerned in the open or casually crossing roads, sometimes genuinely tame, at others making for cover with remarkable speed if alarmed



Water Rails are seen nearly as often dead as alive: although shy and secretive in their habitat of waterside vegetation, on migration they have a remarkable flair for flying into lighthouses, cables and other man-made obstacles. Flight itself looks weak, with legs dangling. At other times, they prefer to run from danger. Nevertheless, they make substantial movements, southwards from the British Isles through Europe, or from Scandinavia and the Low Countries to the United Kingdom and Ireland.

The breeding season commences early in April, but the presence of nesting Water Rails in a reed- or osier-bed would often be unsuspected but for their strange calls. Most often uttered at dusk or dawn, these sounds are a weird mixture of grunts and squeals, which have been likened to the cries of a dying pig. Dead reeds are the main material for the nest, which is very well hidden in reeds or sedge. The clutch of six to 11 eggs is incubated by both sexes for 19 to 20 days. Young Water Rails leave the nest soon after hatching and are tended by both parents, the female brooding and the male feeding them. Fledging occurs after seven to eight weeks. Parent Water Rails have been seen to remove their young and even eggs from danger by carrying them in their bills. Foods eaten include seeds and berries of waterside plants, insects, molluscs, fish and even small birds.

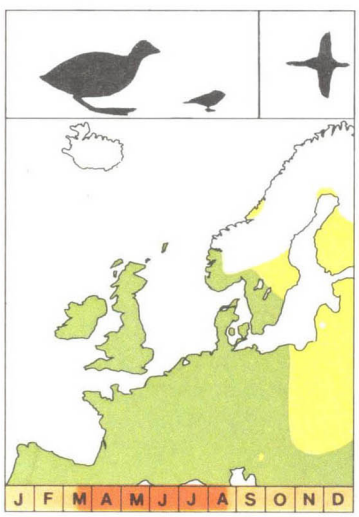
Little Grebe



Though more widely distributed, the Little Grebe, or Dabchick, is less often seen than the Great Crested Grebe, for it spends little time on broad sheets of open water and dives readily when alarmed. Its favourite habitats are ponds, sluggish rivers and canals, with plenty of vegetation growing in their shallow margins. Often, the only indication of its presence is the curious tittering call, resembling high-pitched, hysterical laughter. This cry has a sexual function, and is often uttered as a duet by members of a pair, facing each other with necks upstretched. As the rest of their displays are less elaborate than those of other grebes, and the head lacks tufts or frills, it appears that sound largely replaces sight in the Little Grebe's courting activities.

The nest is a floating mass of rotten vegetation, similar to that of the Great Crested Grebe but smaller. Both sexes incubate, and, when changing places, the approaching bird brings a strand of fresh green material to add to the nest. Little Grebes are highly territorial, and male and female defend their stretch of water vigorously, intruders being repelled by a series of short rushes with wings half raised. The clutch of four to six eggs hatches after about 20 days. Brooding adults slip quietly off the nest at the least sign of danger, after quickly covering the eggs with nest material. Many young fall victim to predators such as pike or herons.

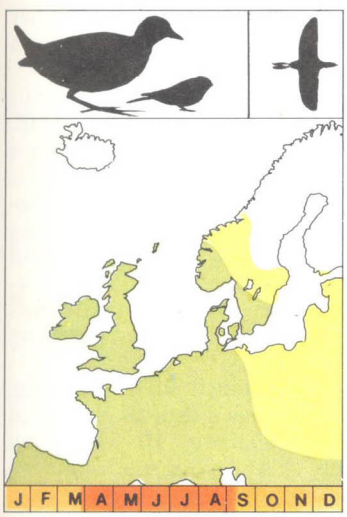
Coot



Coots spend much of their lives afloat, swimming early with the aid of their lobed feet. They dive frequently for food, mainly vegetable, although small fish, worms, molluscs and even ducklings also figure in their diet. Coots inhabiting park lakes may often be seen grazing on lawns near the edge of the water, though they are reluctant to venture as far ashore as the Moorhen. Highly territorial, Coots display strong aggression towards intruders, sometimes even attacking ducks and grebes as well as other Coots. Loud metallic calls and much splashing accompany these encounters.

The nest is of reeds and grasses with a thicker foundation than that of the Moorhen and usually placed among reeds well away from the shore. It is built mainly by the female, while the male collects building materials. Both sexes incubate, but the male continues to bring material even after laying has commenced, so that sometimes one or more eggs are accidentally buried in the nest lining. Four to eight eggs are laid, and incubation lasts 21 to 24 days. The young remain in the nest for three or four days, returning there for a few further nights to be brooded. During this time the male feeds them and the female broods. They are independent at about eight weeks, and two broods are usual. Birds from northern and central Europe move southwest in winter, sometimes as far as Iberia and northern Africa.

Moorhen

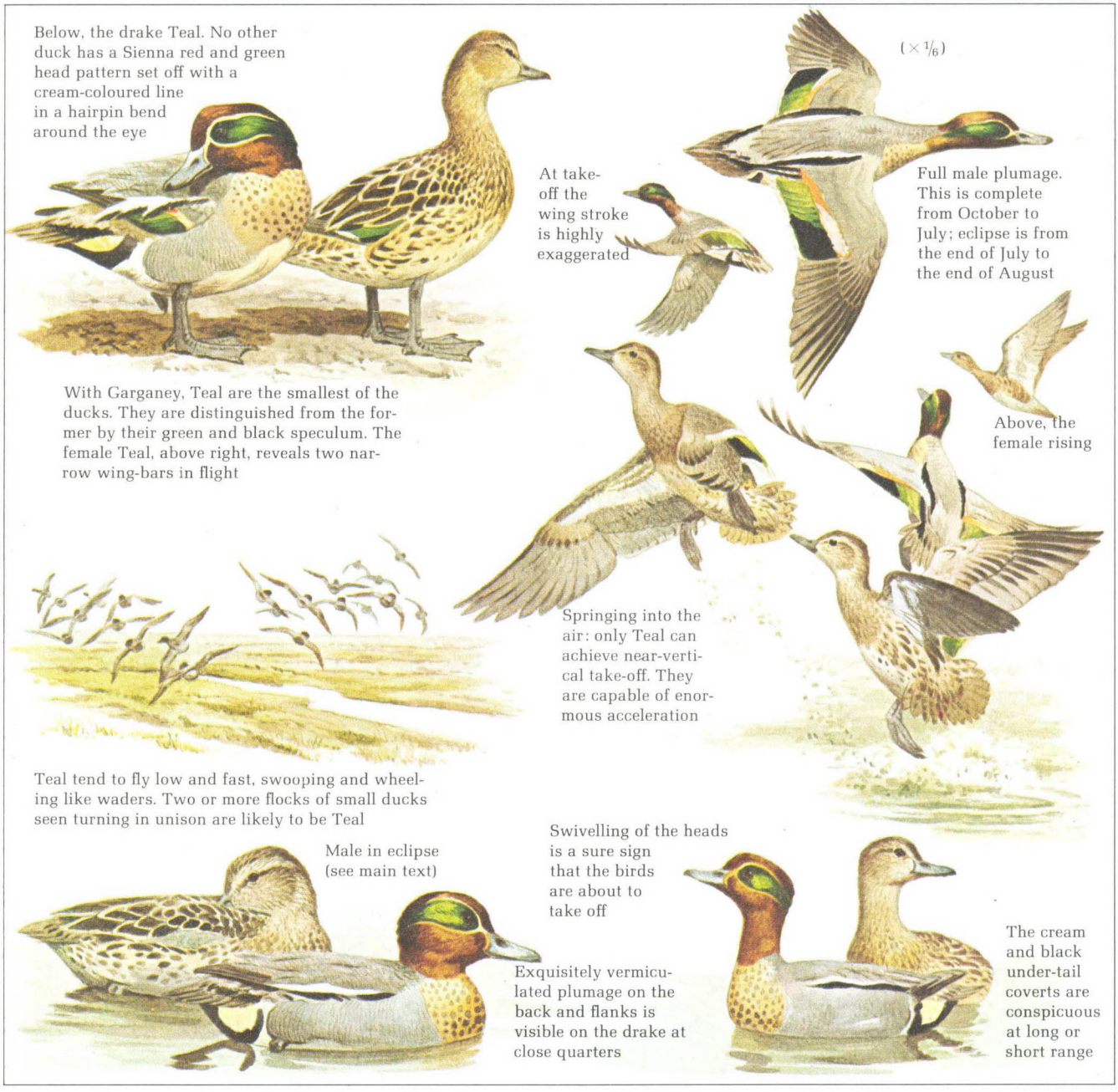


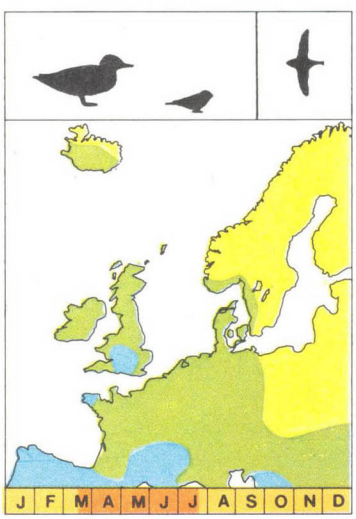
Found in nearly every part of the world except the polar regions, the Moorhen is a highly successful bird, although many of its fellow members of the rail family are endangered or even extinct. A key factor in its survival is an ability to adapt to environments altered by Man. Practically any patch of water surrounded by vegetation suits it, including ponds amid cultivated fields, or in parks and gardens.

Although a shy bird in parts of its range, it is comparatively tame in many parts of Europe, sometimes foraging openly on lawns. Nevertheless, the Moorhen moves quickly when alarmed, running for the nearest thick cover, into which it vanishes as though by magic. Moorhens also dive skilfully, evading danger by surfacing under an overhanging river bank, screened behind hanging grass or nettles. Floating vegetation also provides cover under which a bird may remain submerged for some time, obtaining air by stealthily protruding the bill above water.

The nest is made of dead reeds or flags, usually built just above water level on a mudbank or tussock in a pond or stream. Alternatively, the birds may nest in bushes, often utilizing the abandoned nests of other birds. Males are strongly territorial, repelling intruders by display or by actual fighting. The clutch of five to 11 eggs is incubated by both parents and hatches in 18 to 22 days. The young are able to fly after six to seven weeks.

Teal





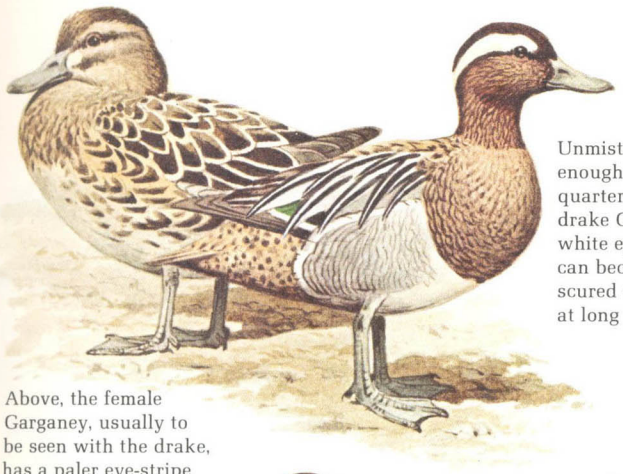
Ducks can be divided on the basis of feeding behaviour into two groups: surface-feeding species and diving species. Surface-feeding, or dabbling ducks, include the Teal, together with the species on the following five pages, and the Shoveler. These birds rarely dive for food, but obtain most of it in shallow water, often by up-ending, or even on land. Dabbling ducks have their legs set well forward on the body, and like the Teal most have a bright patch of colour on the wing called the speculum.

Teal frequent both inland and coastal habitats. On salt-marshes and brackish places important foods are the seeds of marsh samphire and tassel pond weed, and tiny snails gleaned from the mud surface. Inland, the seeds of spike-rush and creeping buttercup, together with aquatic midge larvae, are common items of diet.

Like many water-fowl, Teal carry out complicated displays during courtship. These take place on the water, with a group of drakes swimming around a duck, and involve flicking water towards the female followed by posturing to show off the green speculum and distinctive head markings. Peat moorland, with plenty of rushes and small pools, is the characteristic breeding habitat.

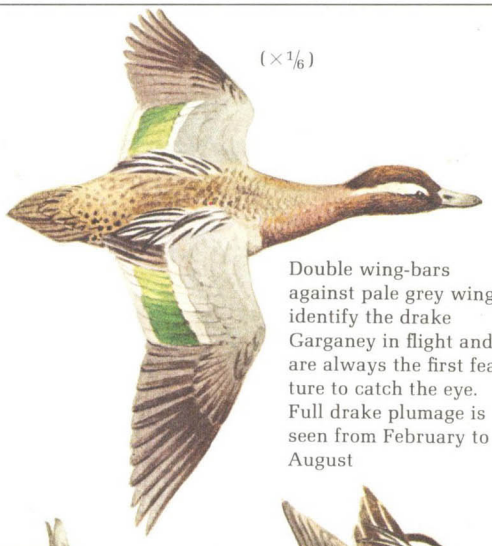
For about a month after breeding, the male undergoes a radical change of plumage, the eclipse. His resulting appearance is virtually the same as female or juvenile.

Garganey



Above, the female Garganey, usually to be seen with the drake, has a paler eye-stripe than the female Teal

Unmistakable enough at close quarters, the drake Garganey's white eye-stripe can become obscured when seen at long range



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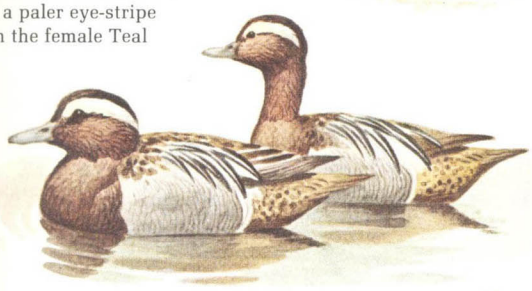
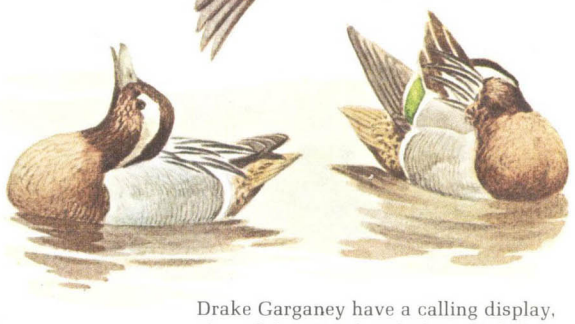
Double wing-bars against pale grey wings identify the drake Garganey in flight and are always the first feature to catch the eye. Full drake plumage is seen from February to August

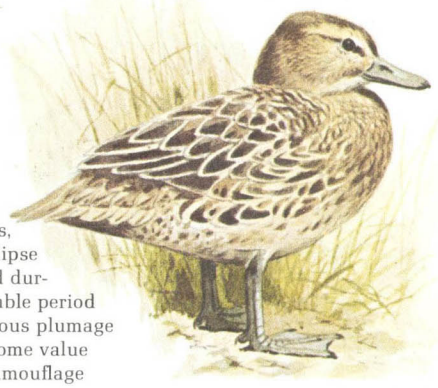




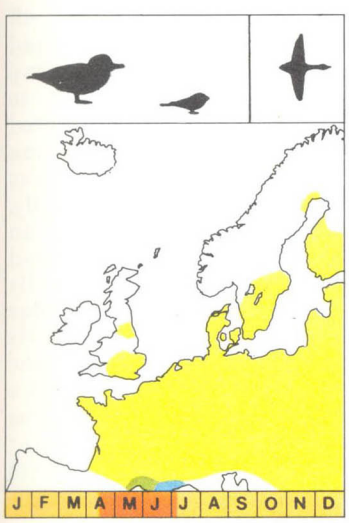
Drake Garganey have a calling display, above left, uttered with the neck fully extended, and sometimes in flight during spring. Above right, the drake's preening display – wings raised

Garganey "pump" their heads before take-off

The female in flight. Garganey are longer winged and shorter bodied than Teal – a difference discernible only to the experienced



Having moulted his primaries, the drake in eclipse is flightless and during this vulnerable period the unostentatious plumage probably has some value as protective camouflage

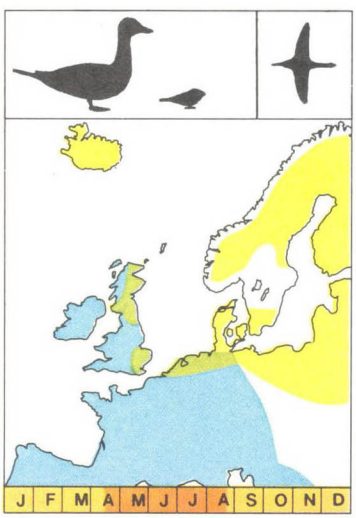


Garganey are trim, elegant little ducks, about the same size as Teal but only distantly related to them. Among European birds, the Shoveler is their closest relative. Besides the blue forewing, the two species share many features of behaviour: for instance, their intention to take flight is signalled by vertical head pumping, rather than lateral head shaking as in other dabbling ducks. Garganey have a mainly southerly distribution in winter, and throughout most of Europe are consequently seen only during the breeding season.

Shallow fresh waters of various kinds are chosen for breeding, and Garganey are usually seen only in pairs or small groups, although large flocks occur at winter quarters. During their displays, male Garganey utter an extraordinary crackling sound, produced with the aid of an enlarged vocal apparatus. It is usually uttered with the head laid back and bill pointed upwards – a posture also used by the female, who utters a quieter quacking note. Nests are usually in coarse grass near a pool or water meadow, lined, like those of most water-fowl, with thick down, which the female plucks from her breast. The ducklings fledge in five to six weeks.

Garganey feed in a similar way to other dabbling ducks, but spend less time up-ending. Animal foods seem to be important, though the Garganey's diet has been less closely studied than that of many ducks.

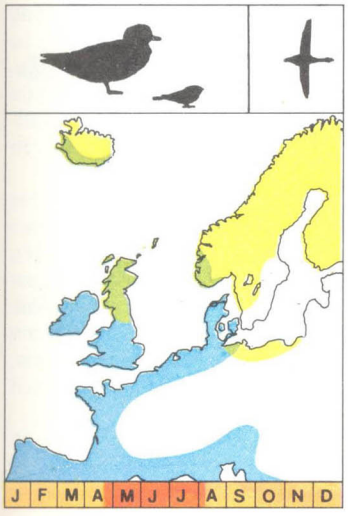
Pintail



Slim and graceful in build, with long, rather narrow bills, Pintail are easily recognized in any plumage. Their breeding range is mainly northerly, and over much of Europe they nest sporadically and in small numbers. Winter populations are augmented by migrants, largely from Russia, and moderate numbers can be seen on most estuaries – though really large concentrations are mainly at inland sites. Pintail up-end a great deal while feeding, and obtain seeds, roots and leaves from various pond weeds and from eel-grass. Grain, rice and even acorns are eaten in parts of the bird's range. Animal food includes insects, molluscs, fish and tadpoles. Pintail are largely nocturnal feeders.

Courtship displays are elaborate, and the drake's posturing shows off the white head-stripe, long tail and speculum to good effect. Breeding grounds range from marshland to moorland, but in general nests are sited in rather more exposed positions than those of many ducks, often in quite short grass. Pintail tend to nest socially, sometimes forming small colonies on islands in lakes. The drake Pintail remains fairly close to the nest while the duck incubates the seven to nine eggs – a task lasting 23 to 24 days. He also stays in attendance while she tends the ducklings, and the female's behaviour is strongly protective. She will drive intruders off if possible, or utilize injury-feigning to lure them away from the nest.

Wigeon



With short, stubby bills and high foreheads, Wigeon have head profiles quite unlike other surface-feeding ducks. This difference is connected with their feeding habits. Primarily grazers, they spend little time dabbling: hence, they do not need the long, wide bills which their relatives possess for straining food particles out of water. Mudflats and salt-marshes are their main winter habitat, and eel-grass, green seaweeds or salting grass are their foods—a diet similar to that of the Brent Goose. It is common to see the two species feeding close together and Wigeon probably benefit by gleaning scraps left by the Brent. Wigeon also visit inland sites to feed on grass, showing preference for the vicinity of large lakes or reservoirs.

Drake Wigeon call with a far-carrying whistle, which once heard is never forgotten a nostalgic sound especially to wildfowlers, for whom this species is a traditional quarry. Even females are easily recognized by their quacks, which have an unusual growling quality. Pairing takes place before return to the breeding grounds, and there is relatively little courtship display in this species, which is more strictly monogamous than most dabbling ducks. Nests are sited near shallow lakes, often quite small ones, amid tundra or moorland. Nine is the commonest clutch size in northern parts of the Wigeon's range, seven to eight farther south. The young fledge in six and a half weeks.

Gadwall

R

The drake is in eclipse from early June until October. Behind him is a female

(×1/7)

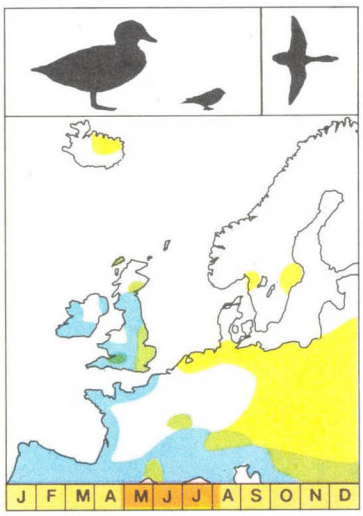
White wing-patches are the most striking feature on a flying Gadwall. Its sobre colouring reduces to simple grey and brown in the distance

As a consequence of walking on land, a dabbling duck has a smaller rear toe than a diving duck, whose foot is larger overall

Below, the duck and, right, the drake, which at close range is characterized by finely vermiculated grey plumage, and at longer range by his black rear quarters

In common with all surface-feeding duck, Gadwall land on the water with necks stretched forwards, taking the impact with their feet

While up-ending, Gadwall can be distinguished from Mallard by their orange-yellow, rather than orange-red, legs



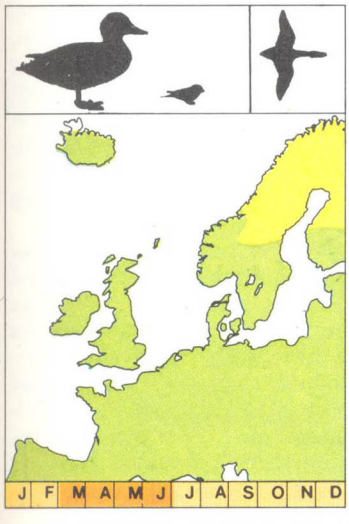
Drake Gadwall look dull by comparison with the males of other surface-feeding ducks, yet their finely barred plumage is attractive at close range. Although Gadwall are very similar to Mallard in size and shape, the two are not believed to be closely related. Behavioural studies suggest the species is related to the Wigeon – both, for example, share a distinctive bill-lifting ceremony, used between members of a pair after a clash with rivals.

Gadwall breed in both Eurasia and North America, but are rather sparsely distributed and breed sporadically over much of their range. Nevertheless, the species seems to be on the increase: it has been deliberately introduced to North America, and in Britain a stock of hybrid Gadwall and Mallard has become established in one locality. In the Old World, greatest breeding density is reached between the Caucasus and the Caspian, and in Europe Gadwall are generally more abundant in eastern countries.

These are exclusively fresh-water ducks, rarely seen on estuaries. Water plants of various kinds are the diet, but animal food is also important, especially during the egg-laying period. When feeding on plants, Gadwall show a preference for the succulent parts, and are much less inclined than most ducks to eat seeds.

Nests are usually well hidden in vegetation, but are sometimes built in exposed places among gulls' and terns'.

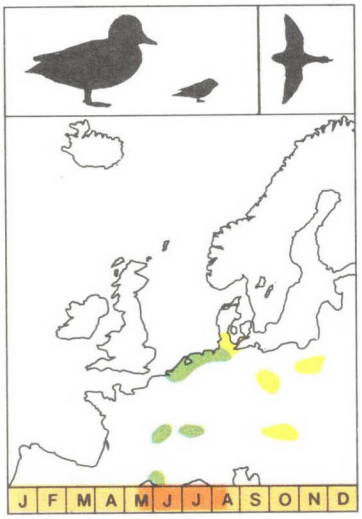
Mallard



Common throughout Europe and in many other parts of the world, the Mallard shows the great adaptability characteristic of a successful species. Its ready acceptance of almost any kind of waterside habitat, including many in man-made environments, was no doubt a key factor leading to its domestication. Versatility is also a feature of the Mallard's feeding habits. Much information on its diet has been obtained by analysing the stomach contents of birds shot by wildfowlers, and these show a great range of foods, varying from year to year as well as between different habitats. Seeds predominate, mostly from small plants, including sedges, pond weeds, shore-growing spinach and many other water plants, but in some places acorns are eaten in great quantities in years following a good oak crop.

Mallard behaviour has been investigated in great detail, and in its general pattern resembles that of other dabbling ducks. The main courtship displays are those leading to pairing rather than mating, and as with other ducks involve mock preening, drinking, water flicking, and head-up, tail-up postures. Mallard nests vary greatly in situation, and are often far from water. Nests on pollarded willows or holes in trees are common, and freak sites among buildings are regularly recorded. Nine to 12 eggs form the usual clutch, and incubation lasts 28 days: the young fledge in seven weeks.

Red-crested Pochard

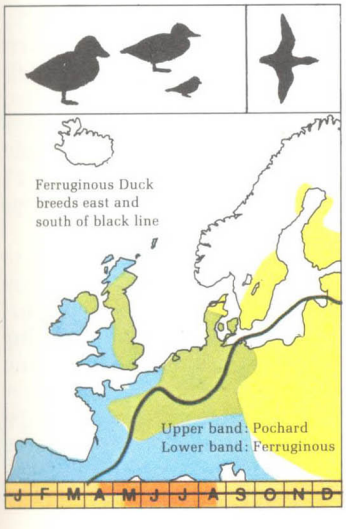


Diving ducks, of which the Red-crested Pochard is an example, differ from surface feeders in a number of ways. Their legs are set farther back on the body, making them clumsy on land, and they have to hold their bodies more erect than dabbling ducks. Stockier in build, they have a different appearance in flight, with thick necks and narrower, differently shaped wings. When taking flight, most diving ducks patter across the surface for some way before becoming airborne and then fly with very rapid wing beats. Diving ducks are generally rather silent, and on the whole sober in plumage. The male Red-crested Pochard is an exception with his bright russet head and red bill.

Deep lakes, either fresh or brackish and preferably with a fringe of reeds, are the typical habitat of this species. Its nests are well hidden in vegetation near the water, and the usual clutch consists of six to 12 eggs. The female incubates for 26 to 28 days from completion of the clutch and cares for the young alone. Six or seven weeks are required for fledging.

During the last four decades or so, the Red-crested Pochard has extended its range northwards, and now breeds regularly in Holland. Unfortunately its spread is difficult to trace with certainty, because the species is widely kept in captivity, and escaped specimens cause much confusion. It is believed that northern European breeders winter in the Camargue.

Pochard–Ferruginous Duck



Pochard often associate with Tufted Duck, but in most places are usually less numerous and more shy in behaviour, preferring to keep well away from the water's edge. Their breeding requirements are rather more exacting, a dense fringe of reeds and rushes being a basic necessity before any lake is used for nesting. Primarily a freshwater feeder, the Pochard obtains most of its food by diving, but some feed by dabbling in the shallows. Stonewort provides them with much of their food, but various seeds are taken, as well as a small amount of animal matter.

During courtship, groups of drake Pochard may be seen swimming round a duck. Their principal display consists of laying the head down along the water with the neck feathers raised, giving a strange, thick-necked appearance. To accompany this performance, a curious note is uttered, which has been described as resembling an asthmatic man taking a deep breath at his doctor's request. The nest is usually made in rushes; though substantial and well concealed, it often has only a very sparse lining of down.

Ferruginous Duck have a limited breeding distribution in Europe, largely confined to the southeast, but are more widespread in winter, when they are seen as far west as Britain. Occurring more frequently on salt water than the Pochard, their diet appears to include more animal matter, such as molluscs and small fish.

Tufted Duck—Scaup

R M_W

Female in eclipse

Male and female Tufted Duck in eclipse plumage (July-September). Female belly plumage varies from all brown, left, to nearly white

Adult male in eclipse

Adult male Tufted Duck in winter plumage

Scaup, below, use feet and wings (including the alula or "bastard" wing) when diving for food

Adult male Scaup in flight, showing the characteristic pale grey back. The bird is larger than the Tufted Duck but has a similar wing pattern

(× 1/6)

At a distance, adult Tufted Duck appear all black and white, but the bright yellow eye is a distinct feature

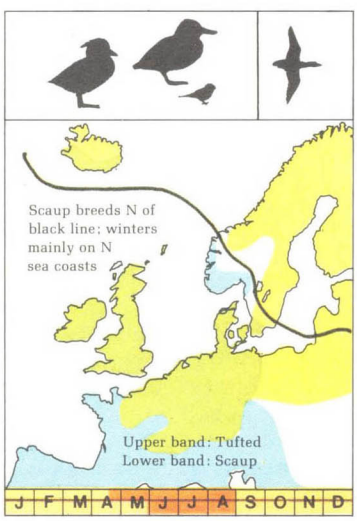
(× 1/6)

Above, on landing, ducks use their large feet as rudders

Below, the female Scaup has a white blaze round the bill

Female Tufted Duck often nest together on an island in a lake

In addition to the grey back, Scaup have longer, broader bills than Tufted Duck. Neither sex has a crest on the head

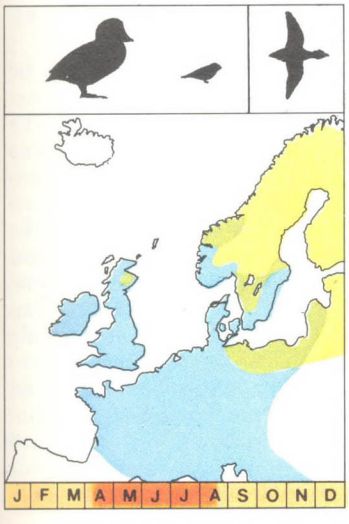


Tufted Duck have habitat requirements very similar to those of the Pochard, though they are even more strictly tied to fresh water. However, it is a basic rule of ecology that two species with identical requirements cannot live together, so it is not surprising to find that the diets of these two ducks differ considerably. Tufted Duck take much more animal matter during their diving forays to the muddy floors of lakes or reservoirs, the usual items being insect larvae, molluscs and crustaceans, with relatively small amounts of water plants and their seeds.

Nesting habits are also different from the Pochard's. Tufted Duck usually site their nests in drier positions sheltered by a grass tussock, but often make up for their greater exposure by nesting on islands—an effective deterrent to some predators, especially foxes. As islands are often small, Tufted Duck tend to be social nesters. Always well lined with down, the nests hold seven to 12 eggs, which hatch after 23 to 27 days' incubation; the young fledge in about six weeks.

Scaup are mainly winter visitors to the UK and are seen from October to March. Outside the breeding season, they are salt-water ducks, congregating often in very large flocks on bays and estuaries where there are extensive mussel beds. Northern lakes, amongst moorland, fells and forest are the breeding habitat, and like Tufted Duck they may group their nests on islands.

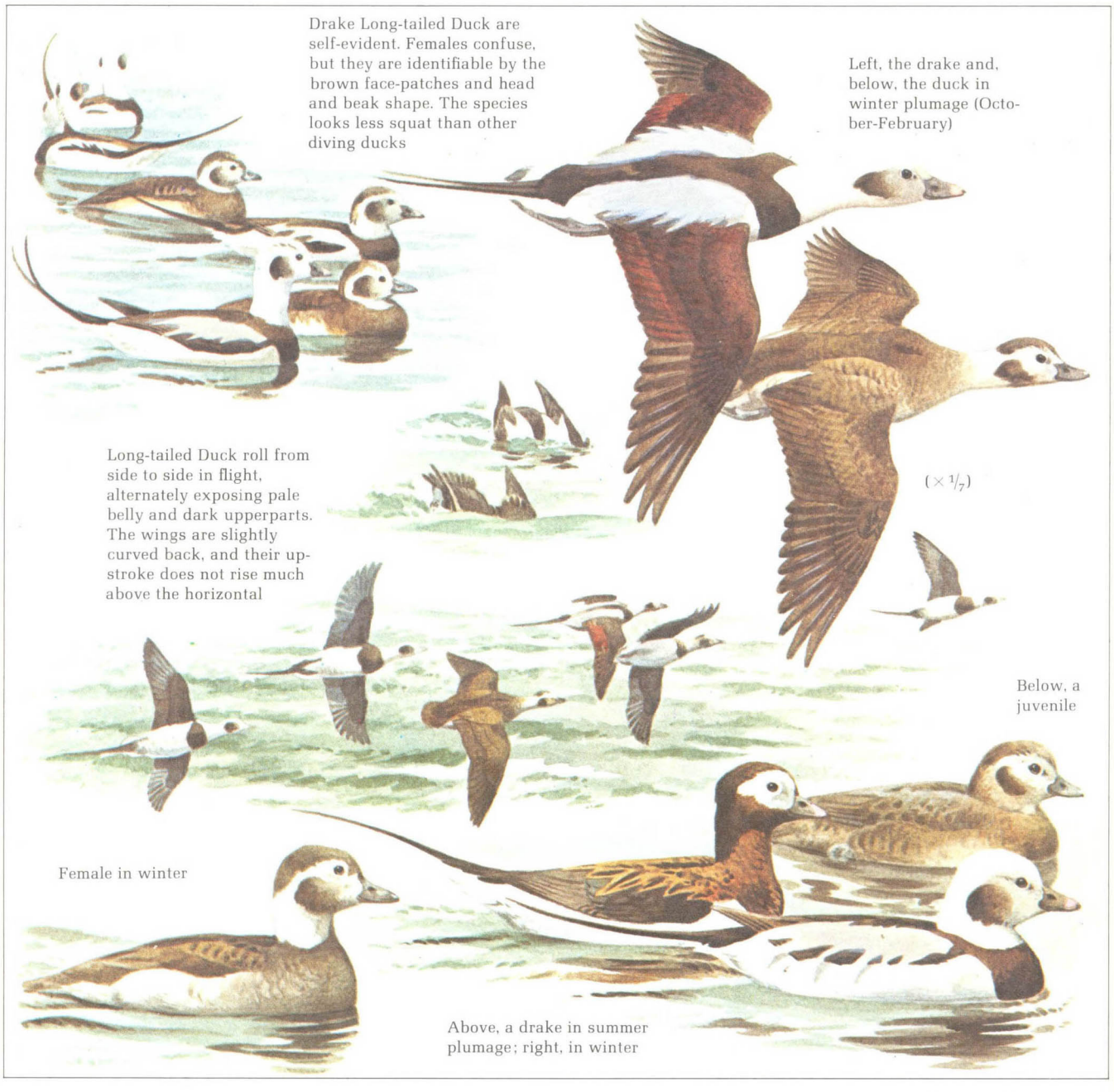
Goldeneye

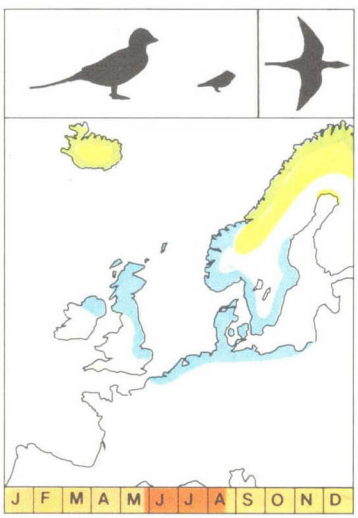


Flying, or swimming, Goldeneye are easy to identify. Passing overhead, their wings make a loud whistling noise which at once distinguishes them from other ducks. On the water they show a characteristic head shape, with high foreheads and short bills. Goldeneye dive deeply, and seek much of their animal food by turning over stones at the bottom of lakes or estuaries. For this purpose, a short, robust bill is a more suitable implement than a long one. The high forehead allows a large air space to be accommodated in the roof of the skull. This is an unusual feature in diving ducks, most of which have denser skull construction than surface feeders for the purpose of reducing buoyancy. Possibly the air sinuses in a Goldeneye's skull provide an air reservoir to permit more prolonged dives.

Forested areas, with plentiful lakes and waterways, are the habitat chosen for breeding. Trees are a necessity because the normal nest site is a cavity in old timber. Inside it, a mixture of wood chips and down provides the bed for six to 15 eggs, which are incubated for 26 to 30 days. On hatching, the young remain in the nest for about 24 hours to dry out, and are then called by their mother to the ground below. They tumble out, preserved from injury by their small size and thick down, and are able to fly after eight to eight and a half weeks. A few pairs probably breed in Scotland.

Long-tailed Duck



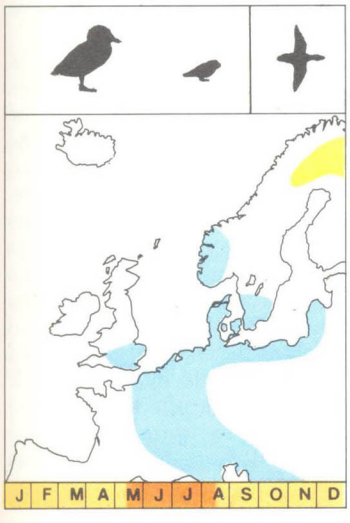


Distant hounds, or the skirling of bagpipes: both similes have been applied to the calling of Long-tailed Duck, but neither quite captures the haunting quality of the sound. It is frequently heard in spring, for courtship starts before the ducks have left their wintering areas for the high Arctic breeding grounds. Parties of drakes gather round a duck to display by raising first tails, then bodies, calling with increasing intensity until the whole group takes off in a headlong chase.

Shallow seas rather than estuaries are the favoured winter habitat—Long-tailed Duck like to forage in clear water. Suitable conditions are found in many parts of the Baltic, where the species congregates in huge flocks sometimes many thousands strong.

The actual breeding environment is among tundra pools. Pairs tend to be scattered, although they regularly nest in association with Arctic Terns. The birds arrive just before the thaw has ended, and wait offshore until conditions improve. In such barren surroundings there is little cover for the nest, which is a simple hollow lined with grass and down. The five to nine eggs are, like those of any duck, incubated by the female alone, but the male does stay near the nest at first. Hatching occurs after 23 to 25 days; no precise fledging period is recorded, but the young are independent after five weeks. Crabs, periwinkles and various bivalves are the major food items.

Smew



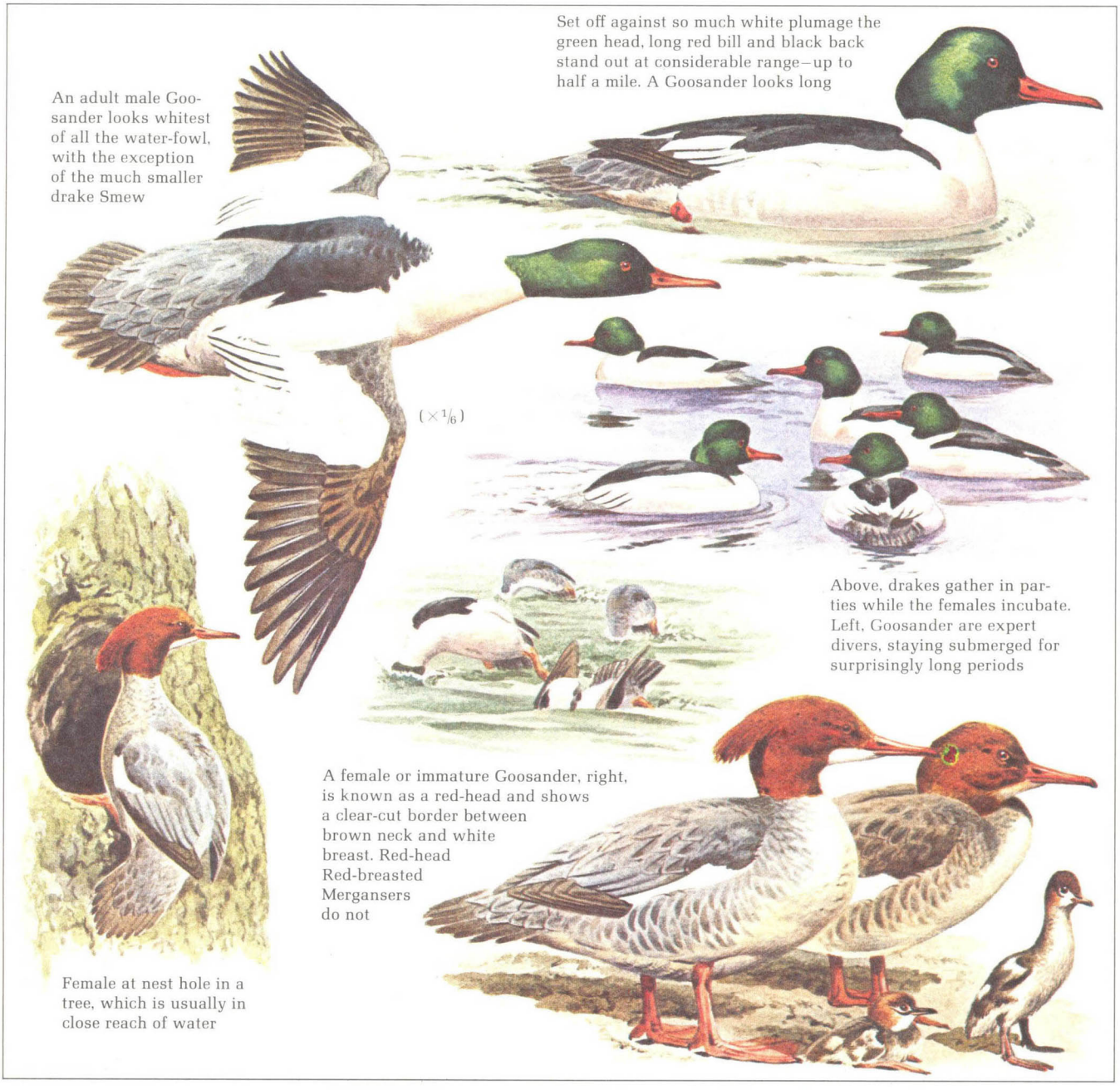
Utterly charming in its almost entirely white plumage, the drake Smew could almost be mistaken for one of the floating fragments of ice which litter its winter habitat. Females and young drakes are more conventionally attired, though still quite distinct from other ducks—but in poor light it is possible to confuse them with Black-necked or Slavonian Grebes.

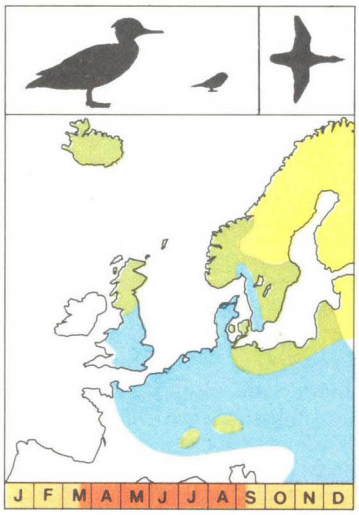
Smew, together with Goosanders and Mergansers, belong to the sawbill group of ducks: the margins of their beaks are studded with tooth-like projections which help to grip fish. Compared with the other sawbills, Smew are smaller and shorter billed, and their diet includes quite large quantities of prey other than fish. Fish are nevertheless the main source of food in winter, when the Smew's day is occupied with spells of intensive fishing lasting 25 to 30 minutes, separated by five-minute pauses to rest and preen. Paired Smew dive together, and sometimes large flocks fish in unison—a habit also observed in other members of the sawbill family.

Winter habitats include various shallow waters, such as harbours and reservoirs; the summer environment is a lake or river surrounded by woodland. Holes in trees, or sometimes nest-boxes, provide nest sites, and a clutch of six to ten eggs is laid. Throughout the 30-day incubation period the male remains near by, but when the young hatch he leaves to moult.

Goosander

R



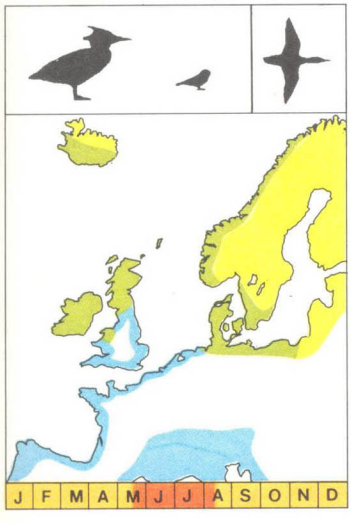


Largest of the sawbills, the beautiful Goosander has shown a welcome extension of range. It started to breed in Scotland in about 1871 and by the 1940s had spread to northern England.

During summer, it frequents large lakes and rivers, preferably in wooded country, though trees are absent from its Icelandic breeding grounds. Some of the waters it frequents may at this time of year be at quite high altitudes—up to 1,600 feet in Britain and 4,000 feet in central Europe. Winter habitats are normally large inland waters—many reservoirs providing ideal conditions. Goosander feed almost exclusively on fish, and their spread in Britain has not met with universal enthusiasm: anglers and water bailiffs fear damage to stocks of young trout and salmon, and the bird has been persecuted.

Like most sawbills, the species is usually a hole nester. Hollow trees provide nest sites in most places, the cavity being up to 30 feet from the ground. In Iceland, rock crevices or even exposed situations must suffice. The female often spends long periods off the nest fishing—a general feature of sawbill breeding biology. The eggs are kept warm by being buried in the nest's thick lining of down and wood chips. Still young, Goosander chicks often climb on to their mother's back while she is swimming, though five seems about the maximum that can be accommodated at once. Fledging takes about five weeks.

Red-breasted Merganser



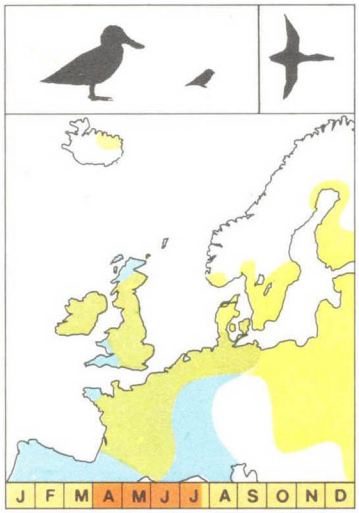
Speeding along an estuary, neck and bill stretched out stiffly in a straight line with the body, Red-breasted Mergansers are easily distinguished from other maritime ducks.

Unlike the Goosander and Smew, this sawbill rarely occurs inland during the winter, and even during the summer it shows a fondness for sea lochs and fjords as breeding habitats, though large fresh-water lakes also suffice. Like the Goosander, it has recently extended its breeding range to include Britain. Both colonizations seem to have followed large influxes in hard winters, and although the Red-breasted Merganser's spread started 20 years later, it is now the commoner species. Fishing methods include not only diving but also a habit of swimming about with only the head submerged. Young birds appear to fish in shallower water than adults.

Like those of all other sawbill ducks, Red-breasted Merganser courtship displays may be witnessed in the winter quarters. Groups of males cluster round a female, first adopting a hunched posture with the crest raised; then the head and neck are suddenly stretched stiffly forwards and upwards; then the crest is rapidly lowered. Finally, the bird bows, bringing its head down to the surface of the water.

Red-breasted Mergansers do not nest in tree holes, but the sites selected among rocks or vegetation are always very sheltered.

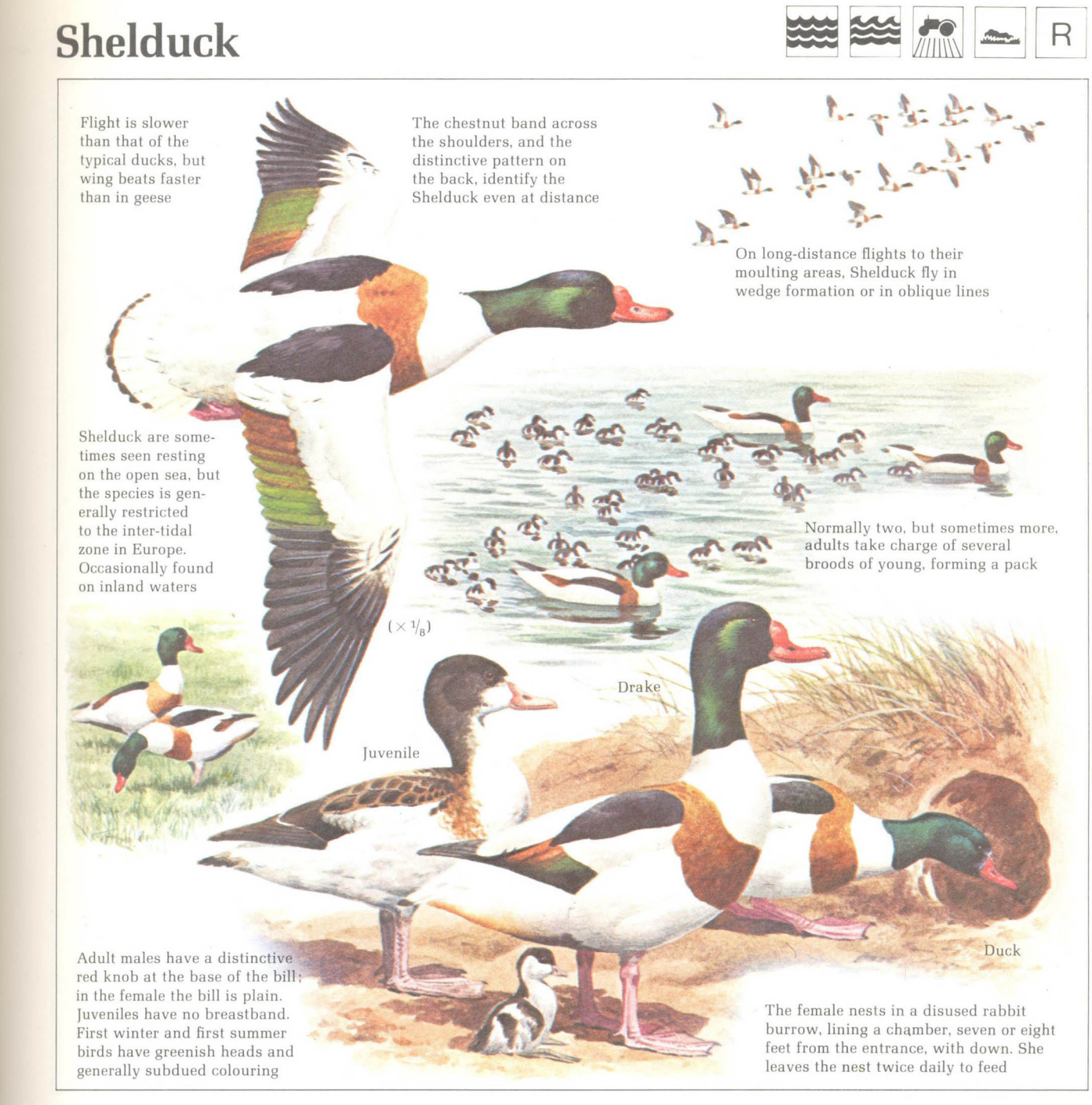
Shoveler



Huge bills and blue forewings on both sexes make the Shoveler the easiest dabbling duck to identify. As might be expected, the unusual bill shape denotes specialized feeding methods, and close examination shows how it operates. Delicate projections, somewhat like the teeth of a very fine comb, fringe the mandible edges, forming an efficient sieve. Basically a refinement of structures found in all ducks' bills, this device enables the Shoveler to live as a filter feeder. With the bill immersed, the bird swims about using the tongue to pump water in and out of the bill. As water is forced over the meshes of the "sieve", tiny food particles are trapped in sufficient quantity to provide worthwhile nourishment. Large groups of Shovelers often feed close together, and it is believed that this agitates the water, bringing more food into the surface layers. Such a feeding method is used to best advantage on shallow, well-vegetated inland waters, though Shovelers also visit estuaries in small numbers.

Specialized as they are, the Shoveler's feeding habits are clearly practical, for it is a numerous and widely distributed species. Breeding habits resemble those of most dabbling ducks, though the nests are often surprisingly exposed. Eight to 12 eggs are laid, and incubation takes 23 to 25 days. The drake sometimes helps the female tend the young, which fledge in six to six and a half weeks.

Shelduck

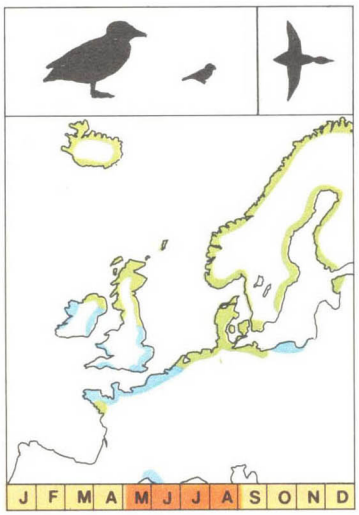


Shelduck belong to a group of birds whose place in the animal kingdom is roughly between typical geese and typical ducks, and they are in many ways very different from other European wildfowl. Molluscs are their staple diet, and most important of those is the tiny snail *Hydrobia*: as many as 3,000 of these little animals have been found in a Shelduck's stomach. This mudflat organism is also an important food for many waders, but unlike those birds, Shelduck can obtain them by up-ending in shallow water, as well as by foraging on the mud. Since many *Hydrobia* retreat into the mud at low tide and only emerge when the sea covers them again, Shelduck are able to exploit them under considerably more advantageous conditions than most waders.

Shelduck make their nests in burrows – commonly those of rabbits. Although the female incubates alone – hissing at intruders, like many hole-nesting birds – the male is never far away. Often both parents leave their young well before the end of the six-and-a-half to eight-week fledging period. Young Shelduck abandoned in this way join up into groups in the care of a few adults; meanwhile, their parents have migrated to one of the species' large communal moulting areas, such as the Knechtsand on the German Bight, or Bridgwater Bay on Britain's Severn estuary – places where until recently they have been endangered by air force bombing practice.

Eider

R

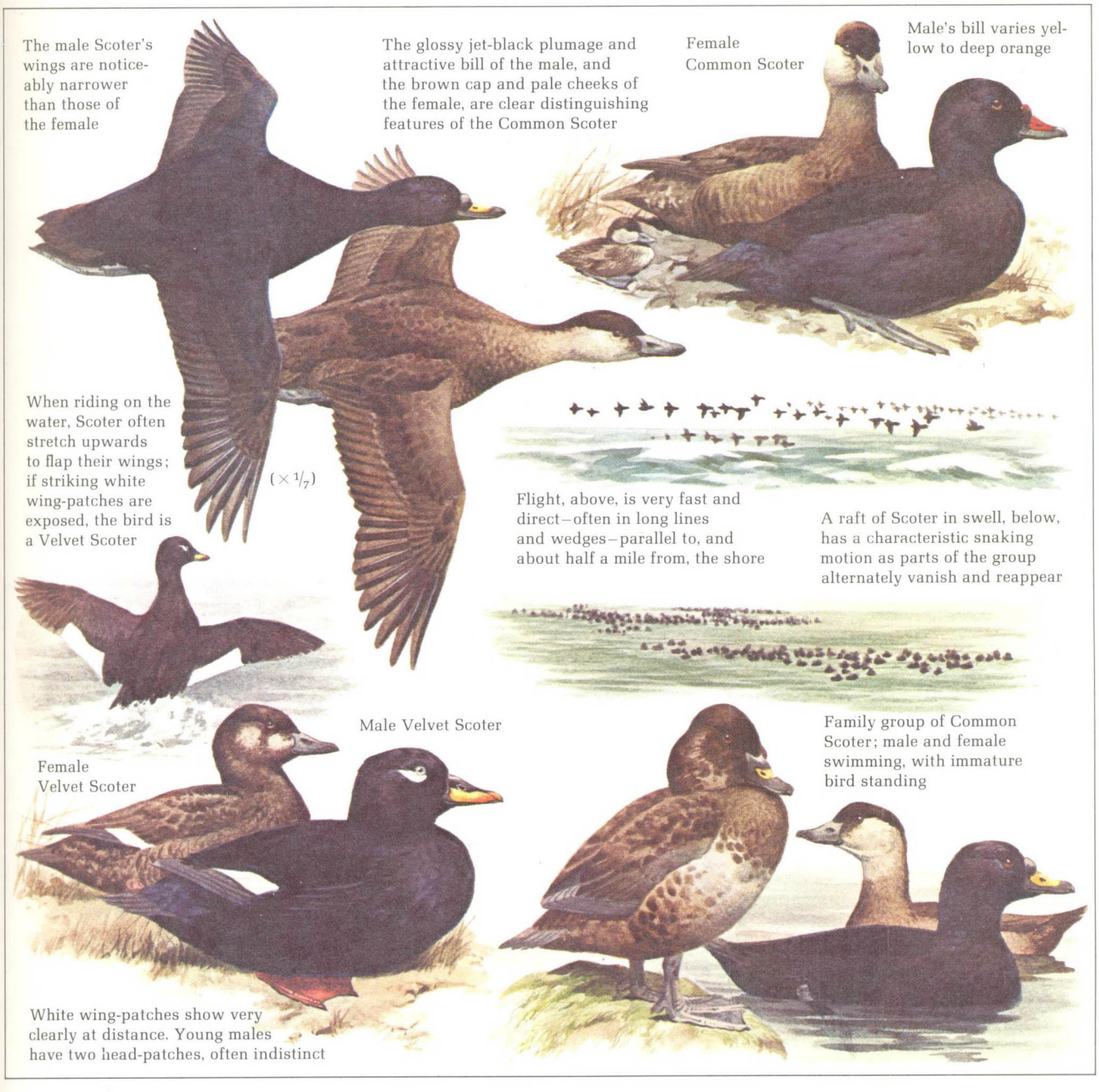


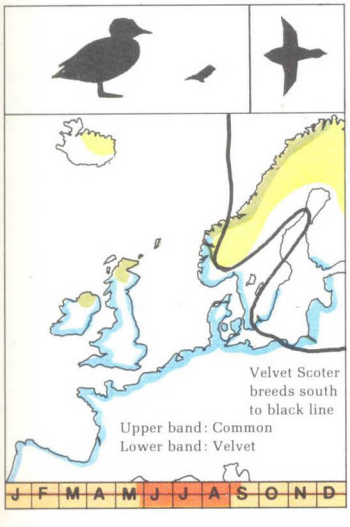
Eider-down has long been used as a heat insulating material, and still has some economic importance. Though not greatly different from the down used by other ducks to line their nests, the Eider's is plentiful and easily collected. On Eider farms in Iceland and other parts of Scandinavia, several thousand pairs are induced to nest in semi-domestication by efficient protection and provision of artificial nest sites—one of the more praiseworthy forms of human exploitation of wildlife. Despite heavy mortality caused by oil spillage on the high seas, Eider are increasing, and a count in 1973 revealed nearly 600,000 in the Baltic alone.

These birds feed in shallow waters, rocky or muddy, and are much more inclined to forage by up-ending than most diving ducks. A close study of their feeding behaviour on a Scottish estuary disclosed another feeding technique: the feet are used to excavate a crater in barely submerged mud and this is then explored with the bill. When they do dive, they swim with the wings half open. Mussels are the principal food, those taken ranging between two and 24 millimetres long; they may be crushed, but are usually eaten whole; crabs and starfish are also eaten.

Natural nest sites include turf, rocks and even ruined buildings. On hatching, Eider ducklings are led straight to the sea, where broods intermingle during the long fledging period of up to ten and a half weeks.

Common Scoter–Velvet Scoter



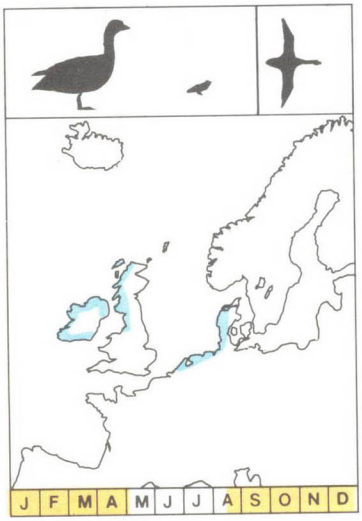


The pathetic, oil-drenched specimens washed ashore after gales provide for most Europeans the closest glimpse they ever have of Scoter. The birds usually fly well offshore in long lines half hidden by waves, a habit which makes them vulnerable to the nets of bird-catchers on their Baltic migration route.

To see scoter at their best, it is necessary to take a boat trip to their feeding grounds–shallow areas of sea where mollusc-rich sand-banks come close to the surface. Here the Common Scoter may be found in dense rafts of hundreds or even thousands; the Velvet Scoter is less common, and rarely seen in groups of over 100, generally feeding in more scattered parties. While swimming underwater both species often open their wings, perhaps to assist steerage–a habit shared by Long-tailed Duck and Eider.

Lakes among northern forests are a typical summer habitat for both species, but the Common Scoter also inhabits treeless areas and tundra, while the Velvet Scoter shows a preference for more mountainous inland regions. Both species place their nests on the ground, sheltered under vegetation; Velvet Scoter sometimes nest at the foot of a tree. Clutch sizes for both species are in the range of six to ten eggs, and incubation takes about four weeks. Common Scoter require six to seven weeks to fledge; chicks of the Velvet Scoter are independent after four or five weeks.

Barnacle Goose

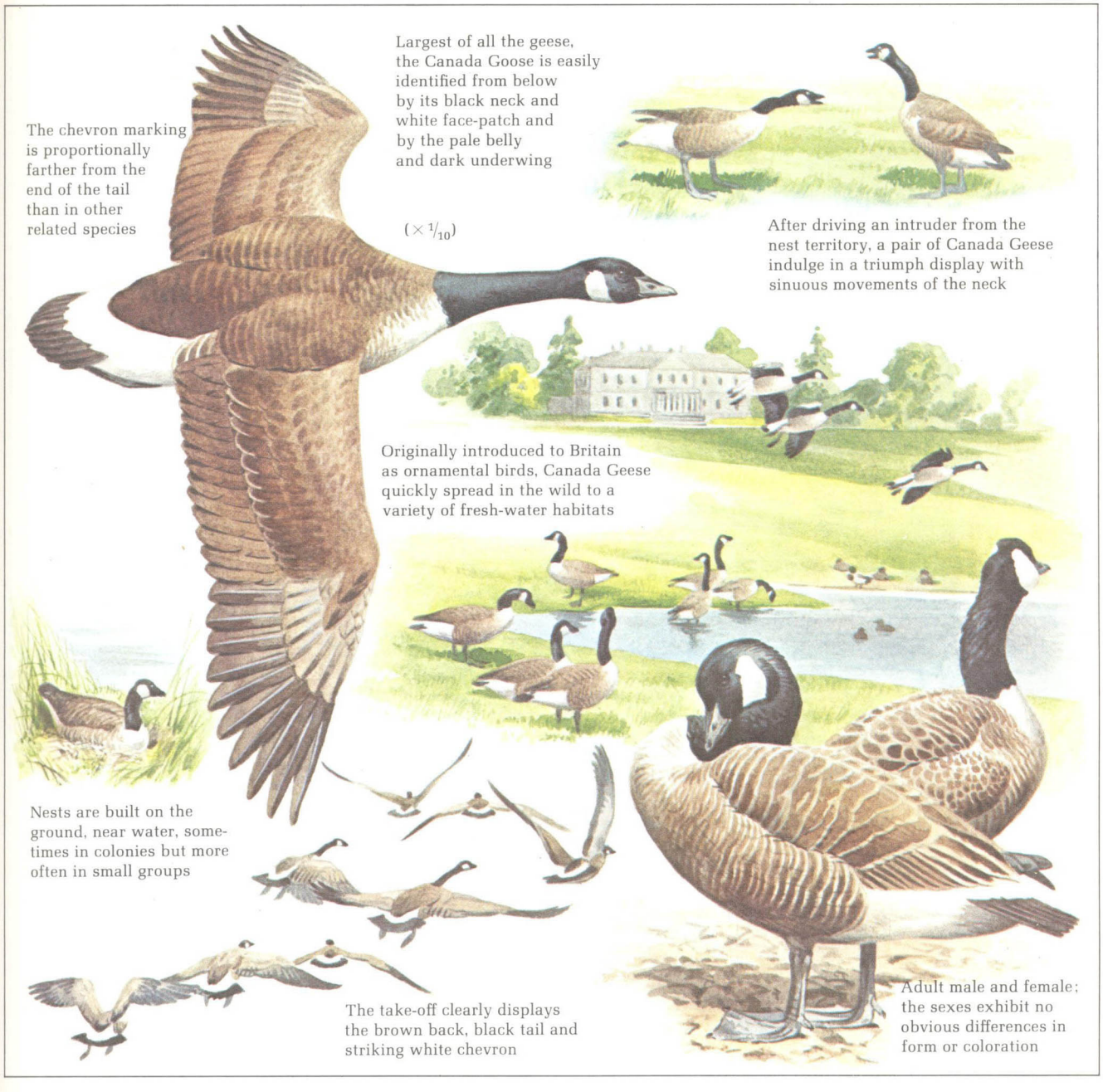


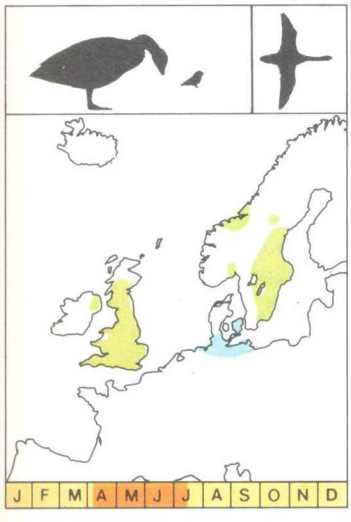
Reclamation of coastal mudflats is not always disastrous for waders and wildfowl. Extensive reclamation carried out in Holland, for example, has denied the shore-living Brent Goose valuable feeding ground, while providing its relative the Barnacle Goose with a huge new acreage of pasture.

Barnacle Geese eat short rich turf on coastal meadows and certain types of salt-marsh. Recent research has shown that seeds also form a large part of their diet—a rather unusual feature among geese. They are taken in greatest quantity from rushes, probably by stripping fruit clusters directly from their spiky stems. Feeding takes place in daylight, the geese moving to and from their roosts on tidal flats at dusk and dawn. When there is a full moon, feeding may continue at night.

The quaint old myth that these geese hatch from barnacles is misleading in every sense—their nesting habits are entirely those to be expected of their family. Irish and Hebridean Barnacle Geese breed in Greenland; those from Solway in Spitsbergen, while birds wintering in Holland and on the Baltic island of Gotland breed in northern Russia. Nesting commences on snow-free areas before the Arctic thaw is completed. Sites chosen are either on rock outcrops or small islands—places giving protection from such predators as Arctic foxes. In common with other geese, the male guards his brooding mate and both parents tend the young.

Canada Goose

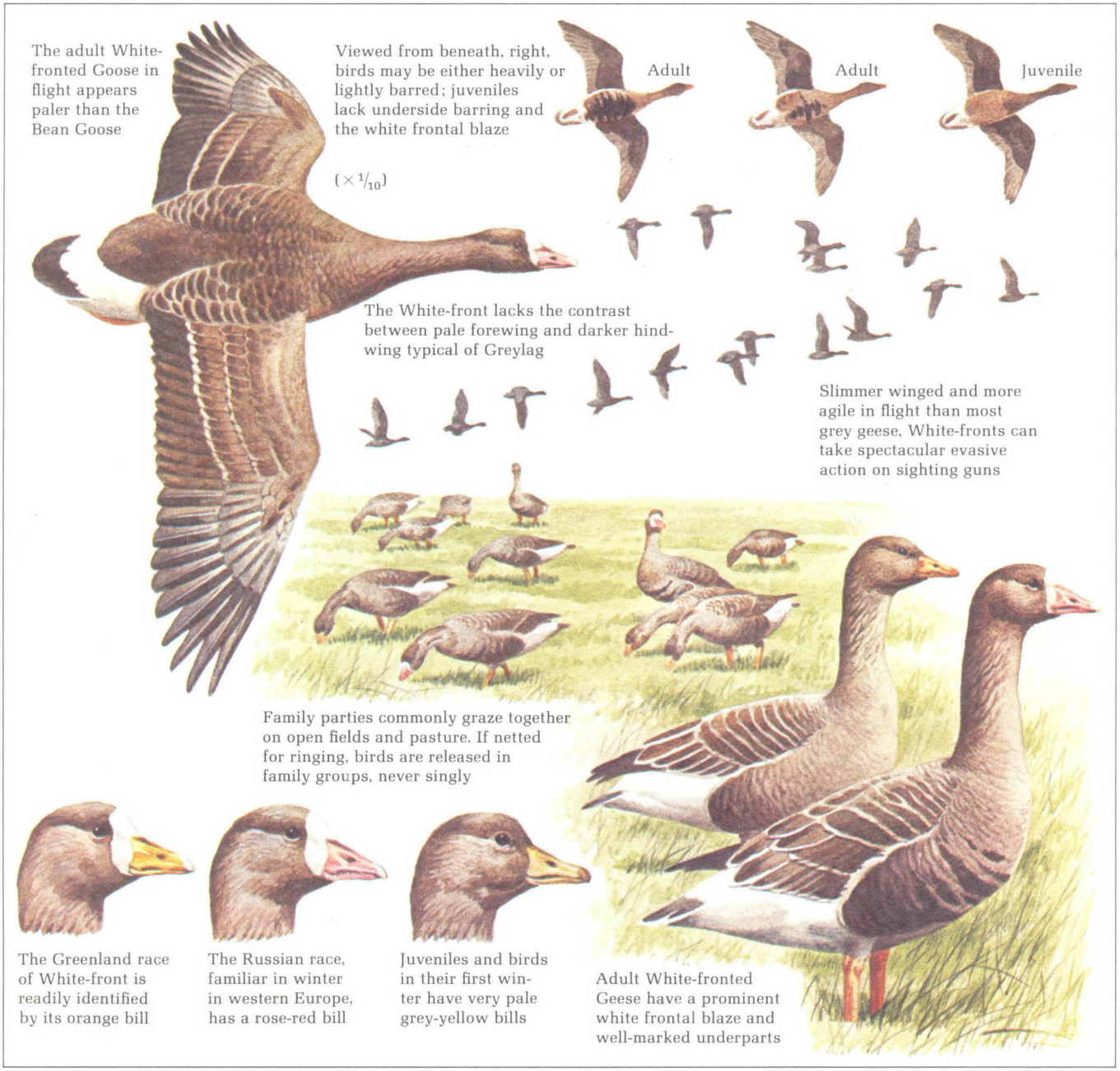


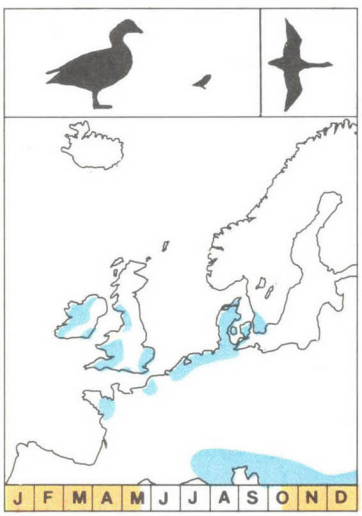


To bird-watchers in North America, this is the most familiar wild goose, and is a common sight on migration in spring or autumn throughout the continent. Although Canada Geese introduced from that continent have established themselves in parts of Europe, they have never quite emulated the success of their transatlantic forebears. In North America the Canada Goose is a highly variable species, with several races differing greatly in size and depth of colour. Those introduced into Europe belong to the large, pale Atlantic coast race; birds of other races, probably genuinely wild vagrants from North America, have occasionally appeared in Ireland and Scotland amongst flocks of Barnacle or White-fronted Geese. A survey in 1953 found some 1,500 pairs in Britain, and numbers have increased since then; the Swedish population is about 2,300 pairs, and there have recently been nesting occurrences in Norway and Denmark. In winter, Swedish birds visit coastal areas of the southern Baltic and northern North Sea, and some move inland as far as Switzerland.

Meadow and pasture near water are the typical habitat in Europe, and for breeding purposes the Canada Goose resorts to lakes, gravel pits and parkland. The nest of grass and reeds lined with down is usually close to water, sheltered by rough vegetation or bushes, and is often on an island. Five or six eggs are usually laid, and the young fledge after six and a half weeks.

White-fronted Goose





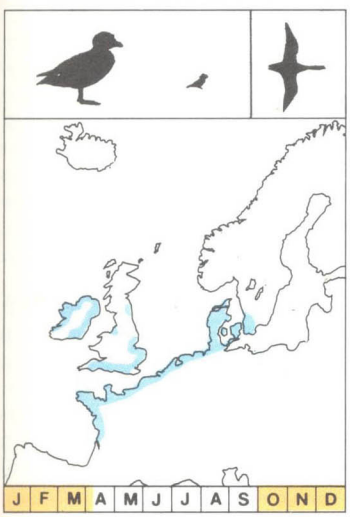
Wild geese in flight can hardly fail to have romantic appeal. Many much smaller birds undertake longer migrations, but their journeys for the most part pass unnoticed. Geese always cause a sensation as a skein beats past in a long line, or in a V formation, strung out across the sky. The chorus of a flock in flight is a stirring sound, and amongst geese the White-front is perhaps the most musical of all—its call having a yodelling quality.

Two races occur in Europe: most numerous is the typical race, wintering in central and northern Europe and in England—these birds come from breeding grounds in Russia. A darker, orange-billed race breeding in Greenland winters in Scotland, Ireland and Wales. Recent years have seen a progressive shift of wintering flocks from central Europe to the Netherlands, where numbers now sometimes exceed 70,000—about half the total European winter population.

Wet pastureland, such as water-meadows, is the favourite habitat and grass is the main diet, although the Greenland race shows a liking for boggy areas, where it consumes the underground parts of white beak-sedge.

White-fronts breed in tundra on islands in rivers or raised areas in bogs. There is a tendency to nest colonially, but each gander defends a small territory around the nest. As with most geese, families stay together until the following season.

Brent Goose



Broad mudflats in bays and estuaries are the exclusive winter habitat of the Brent Goose—only in times of food shortage does it cross the sea wall to feed on fields like grey geese. At other times it sustains itself almost entirely on either eel-grass or *Enteromorpha* seaweed—plants which carpet the mud down to mid-tide level. A large form of eel-grass growing even lower on the shore was once an important food source, but during the 1930s a mysterious disease almost wiped it out on both sides of the North Atlantic. Robbed suddenly of this supply, Brent Goose populations dwindled alarmingly. The Brent had for long been a traditional quarry of the punt-gunner, but by the 1950s it was clear that the species could not survive continued hunting. Protective measures were introduced by several countries, since when its numbers have gradually increased; now estuary reclamation schemes pose a new threat to the future of the species.

Brent Geese nest in the high Arctic. The pale-bellied race from Canada, Greenland and Spitzbergen winters on the eastern seaboard of the USA, in Ireland and at a few localities on North Sea coasts. The dark-bellied race, more numerous in European wintering areas, breeds in the Soviet Arctic. Nests are sited on tundra, often on small islands. The clutch of three to five eggs hatches after four weeks' incubation by the female, but adverse weather causes periodic breeding failures.

Pink-footed–Bean Geese

Like other grey geese, Pink-foot fly in massed batallions or long skeins

The bill of the Bean Goose, right, is very variable; black with either orange or yellow patches individual to each bird

The Pink-foot's bill is pink and black in adults; pink or ochre in immature birds

Bean Goose

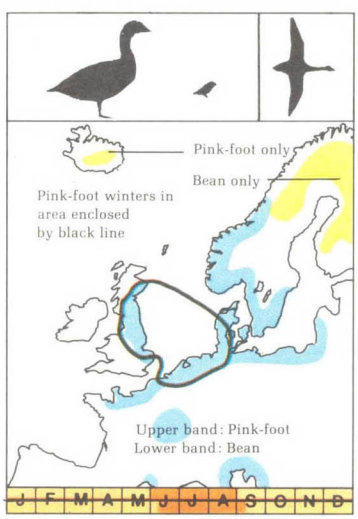
Pink-footed Goose

On the breeding grounds Pink-foot nest on cliffs and rocky outcrops to avoid the Arctic fox; occasionally birds will nest on open tundra

(×1/6)

Though normally daylight feeders, most geese will feed through the night in periods of bright, full, moonlight

Pink-footed Goose and Bean Goose; grey geese have no outward sexual differences

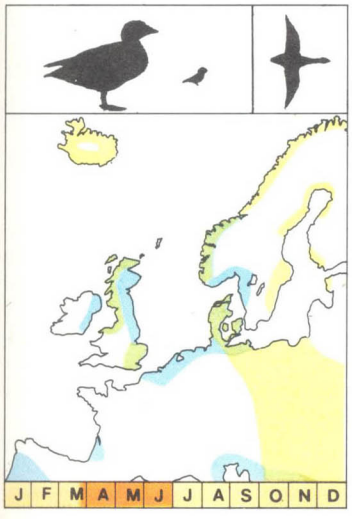


Bean Geese and Pink-footed Geese are closely related, but their habits differ. Bean Geese frequently feed on pasture and in some areas roost inland. They are the most silent of the grey geese. Pink-foot feed largely on stubble, potato fields and other arable land. They roost on coastal mudflats, moving between shore and fields at dawn and dusk. Such movements, called flighting, become irregular during full moon, when feeding may continue at night. Flighting Pink-foot are highly vociferous, producing a thrilling cacophony in which the high-pitched voices of males can be distinguished from those of females, which are an octave lower.

Bean Geese have a much wider distribution than Pink-foot, but their numbers have declined, perhaps due to changes in farming methods. However, they have accepted a predominantly arable habitat in many areas, and must have done so for a long time in England, where their name reputedly derives from a habit of feeding on wasted seeds from the bean harvest. Pink-foot are threatened by a proposed hydro-electric scheme which would flood their most important Icelandic breeding area.

Nesting Pink-foot choose sites on cliff ledges and rock outcrops, and breed in colonies. Bean Geese nest scattered on open tundra by lakes, swamps or rivers. With clutches of four to six eggs and an incubation period of about four weeks, basic breeding biology is similar in both species.

Greylag Goose

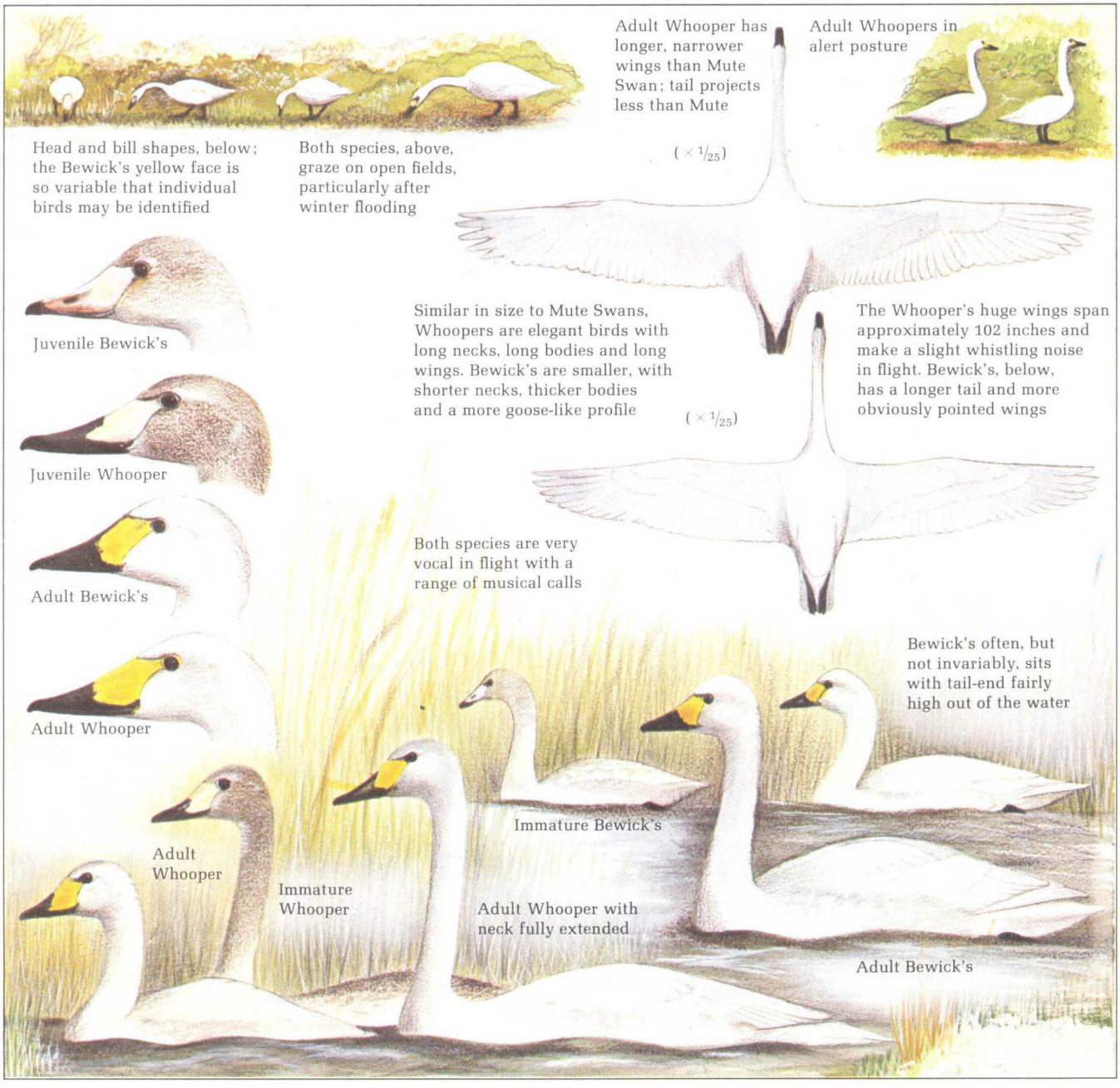


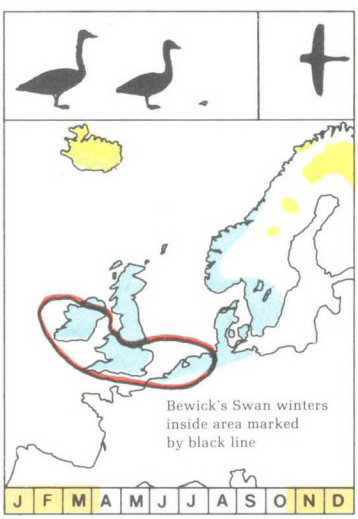
Greylag Geese are the ancestors of all domesticated geese except the Chinese Goose, which descends from the Swan Goose of Asia. In their calls and general appearance, wild Greylags still bear an unmistakable resemblance to the farmyard bird. They are a widely distributed species which breeds farther south than any of the various grey geese occurring in Europe. Introducing it deliberately to new areas has increased its numbers and widened its range.

Behaviour patterns have been more intensively studied in the Greylag than in any other species of wildfowl. Like all geese, it has a complex social organization, maintained by an elaborate system of signals and postures. Pairs normally stay together for life, and family parties are maintained throughout the winter–factors which underlie the remarkable cohesiveness of goose flocks. A fascinating phenomenon revealed through such observations is that of imprinting–a process occurring in all wildfowl and many other birds, but first discovered, and extensively studied, in the Greylag.

Newly hatched goslings follow, and become strongly attached to, the first animal they see after birth. Normally this is their mother, but in experimental conditions it could be a duck, a bantam, even a human being. Whatever it is, the birds will subsequently transfer all their social behaviour to that animal, rather than to other Greylags.

Whooper Swan–Bewick's Swan





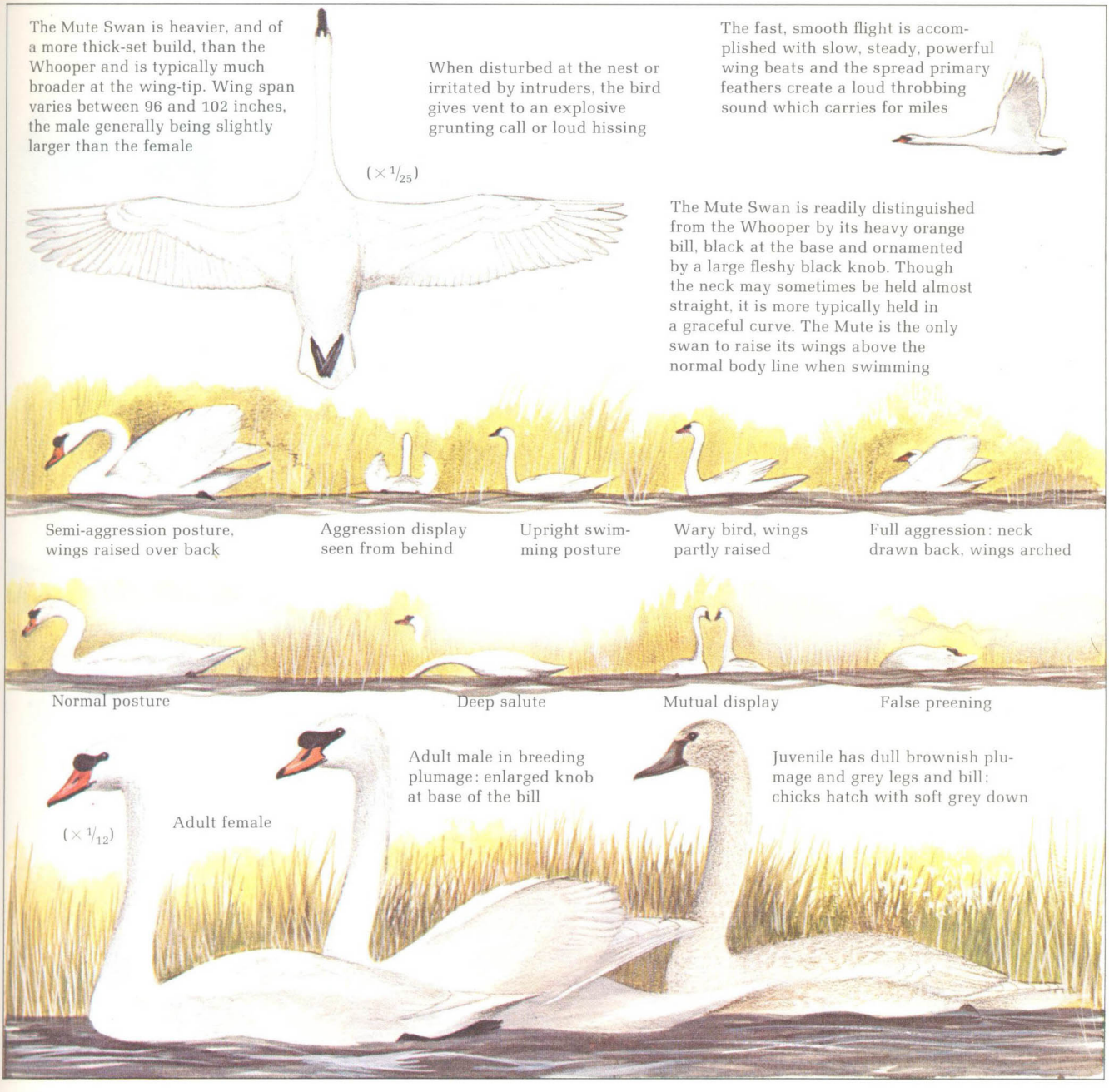
Whooper Swans and Bewick's Swans are above all wild birds, their ancestry untainted by any history of domestication like that of the Mute. Stirring calls, like bugles, seem almost to proclaim their freedom, though their wing beats are virtually silent. Audible at a great distance, these sounds are delivered through a specially elongated windpipe.

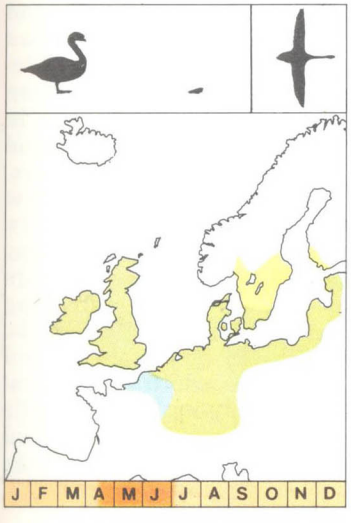
Only the Whooper Swan breeds in western Europe–in Lapland, Iceland and sporadically in Scotland. Its wintering areas are coasts, lakes and reservoirs mainly in southern Scandinavia and Britain, though a few travel as far as the Mediterranean. Bewick's Swan has a very northerly breeding range, confined to the high Arctic zone of the USSR, but is more widely distributed than the Whooper in winter. More partial to inland waters, it visits Holland and Germany in large numbers, and since the cold winter of 1955-6 has greatly increased its population wintering in England.

A sizeable population of Bewick's Swans winters at the Wildfowl Trust in Gloucestershire. Here, advantage has been taken of the great individual variation in bill pattern to chart family history in detail and it has been found, for example, that broods raised in successive years tend to associate in family flocks of up to 15 birds.

Whooper and Bewick's Swans make large nests similar to that of the Mute Swan, but with a more downy lining.

Mute Swan



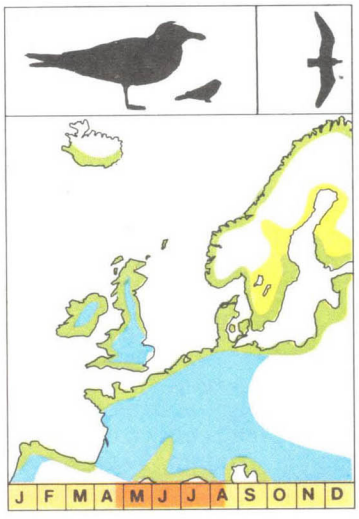


Compared with other swans, the Mute is indeed a poor vocalist, its repertoire consisting of mere grunts and hisses. On the wing, however, it compensates for the deficiency with loud, throbbing wing beats—an exhilarating sound whose rhythm is said to have inspired Wagner when composing the *Ride of the Valkyrie*.

This species is the most common swan of Europe, and in most parts of the Continent it is the only one which breeds. Its present distribution is partly the result of domestication at various times in the past. The ancient ceremony of swan-upping is still performed every year on the Thames: young swans are rounded up and the bills given distinctive marks.

Various water plants and a few small animals constitute the Mute Swan's diet. Large flocks congregate on certain estuaries, and sometimes make serious inroads into the limited stocks of eel-grass. To breed, they resort to inland lakes and rivers, siting the huge and conspicuous nest close to water. Unlike the nests of ducks and geese, these are built by both sexes and the lining contains little down. The male's threat display deters most humans, though the damage inflicted by actual attacks has been exaggerated. Incubation of the three to eight eggs lasts 35 days, and is mainly the female's task, though the male takes over while she is feeding—mainly at night. The cygnets fledge in 13 weeks.

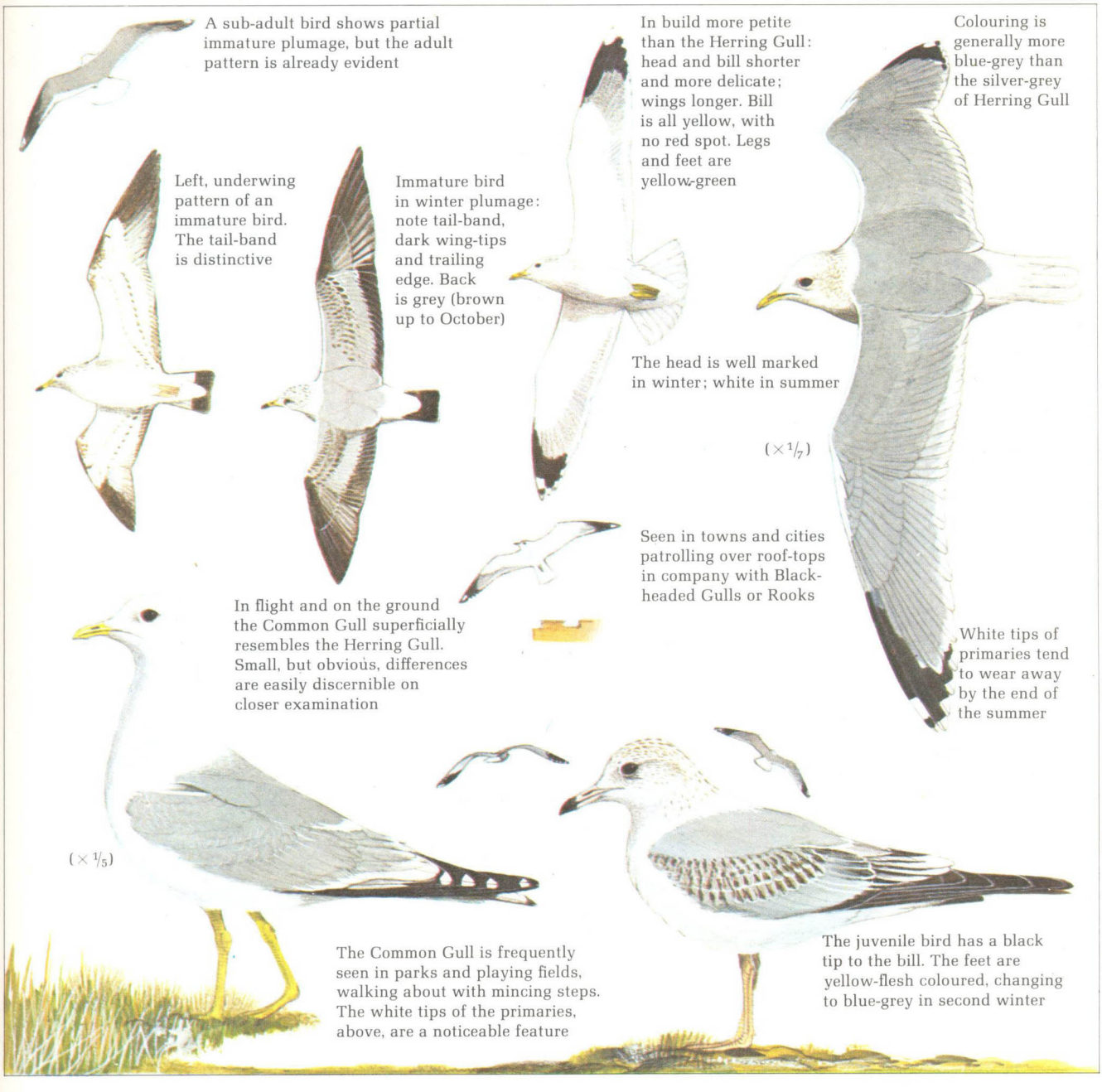
Herring Gull

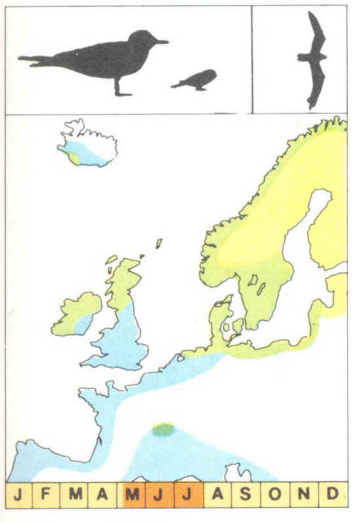


This is the seagull of everyone's imagination. It scavenges rubbish tips and harbours, follows boats for jettisoned titbits and even includes buildings and chimney-pots among its possible nest sites. A dangerous menace on aircraft runways, it has an alarming list of damage and fatalities to its name. It is abundant and on the increase. None the less, Herring Gulls are beautiful and fascinating, and studies of their social organizations have contributed enormously to the understanding of animal behaviour.

They normally nest colonially, traditional breeding areas including coastal promontories, cliffs and dunes. Buildings, lake shores and china-clay pits are more recent colonizations. The nest is a thick pile of grass, seaweed and jetsam amassed by both parents. Two or three eggs are laid at two- or three-day intervals, and sporadic incubation begins before the clutch is complete. In common with all gulls, both male and female brood the eggs for 28 to 33 days. The young leave the nest after a few days, but stay within their parents' territory during their six-week fledging period. The few which stray outside are likely to be eaten by neighbouring adults. Again in common with all gulls, food is brought by both parents, and includes a great variety of material obtained by scavenging. Herring Gulls regularly break open such hard-shelled prey as crabs or molluscs by dropping them from a height.

Common Gull

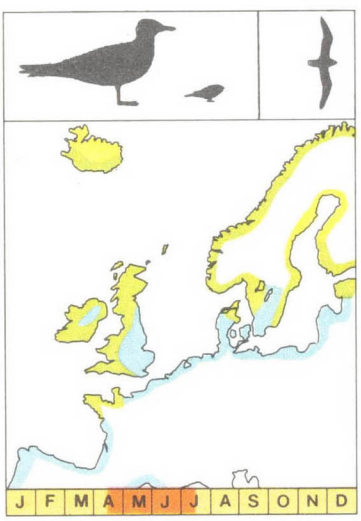




Similar in size to the Black-headed Gull, similar in appearance to the Herring Gull but not quite as abundant as either, the Common Gull is often overlooked—yet it is a widespread species. Its breeding range includes not only northern Eurasia but also parts of Alaska and Canada. It is a gull of sheltered waters, and although strongly migratory, it rarely ventures far out to sea for feeding purposes. Coastal mudflats and agricultural land provide it with much of its food, and in suburban areas it shows particular fondness for playing fields. For roosting, both tidal waters and inland sites such as reservoirs may be used. Feeding methods include not only the usual scavenging techniques of other gulls but also piracy, similar to that practised by skuas, of other gulls carrying food; the Black-headed Gull is often a victim of such pirate attacks.

Common Gulls' nests vary from scrapes with a minimal lining to bulky structures of grass and seaweed. Usually these are on rocks or among vegetation, often near the water's edge, but occasionally they are placed in trees—and in one instance even on an old Rook's nest. They may be solitary or colonial, and are sometimes associated with other gulls and terns. Two or three eggs are laid, and both sexes incubate them for 22 to 25 days. Both parents also feed the chicks, which, like those of all other gulls, are able to walk from an early age.

Great Black-backed Gull

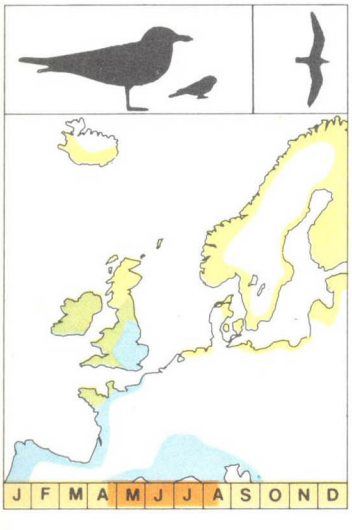


Most of the larger gulls feed in part by the capture of living prey, but this huge and formidable species is the most serious predator of them all. Regular victims include other seabirds and their young as well as rabbits and rodents. Large animals are picked clean, finishing up with the skin turned inside out. Relatively small victims, such as gull chicks, may be swallowed whole, the operation being aided by the bird's ability to increase the distance between the halves of its lower jaw—a capacity shown by many other birds, but especially well developed in gulls.

Great Black-backs are regular predators only during the breeding season. At other times they live by scavenging on carrion, offal and refuse, especially that discarded by fishing boats. Increased fishing activity may be the reason for their multiplication during recent decades. This trend is disturbing to those concerned with the protection of seabird colonies. Campaigns to reduce the numbers of Great Black-backed Gulls have had some success, for example at Skokholm, off the south coast of Wales, where predation of Manx Shearwaters has been significantly reduced.

Often a solitary nester, the Great Black-back amasses a large pile of seaweed, grass and other litter in which to lay the clutch of two to three eggs. Incubation, by both parents, lasts 26 to 28 days, and the young fledge in seven or eight weeks.

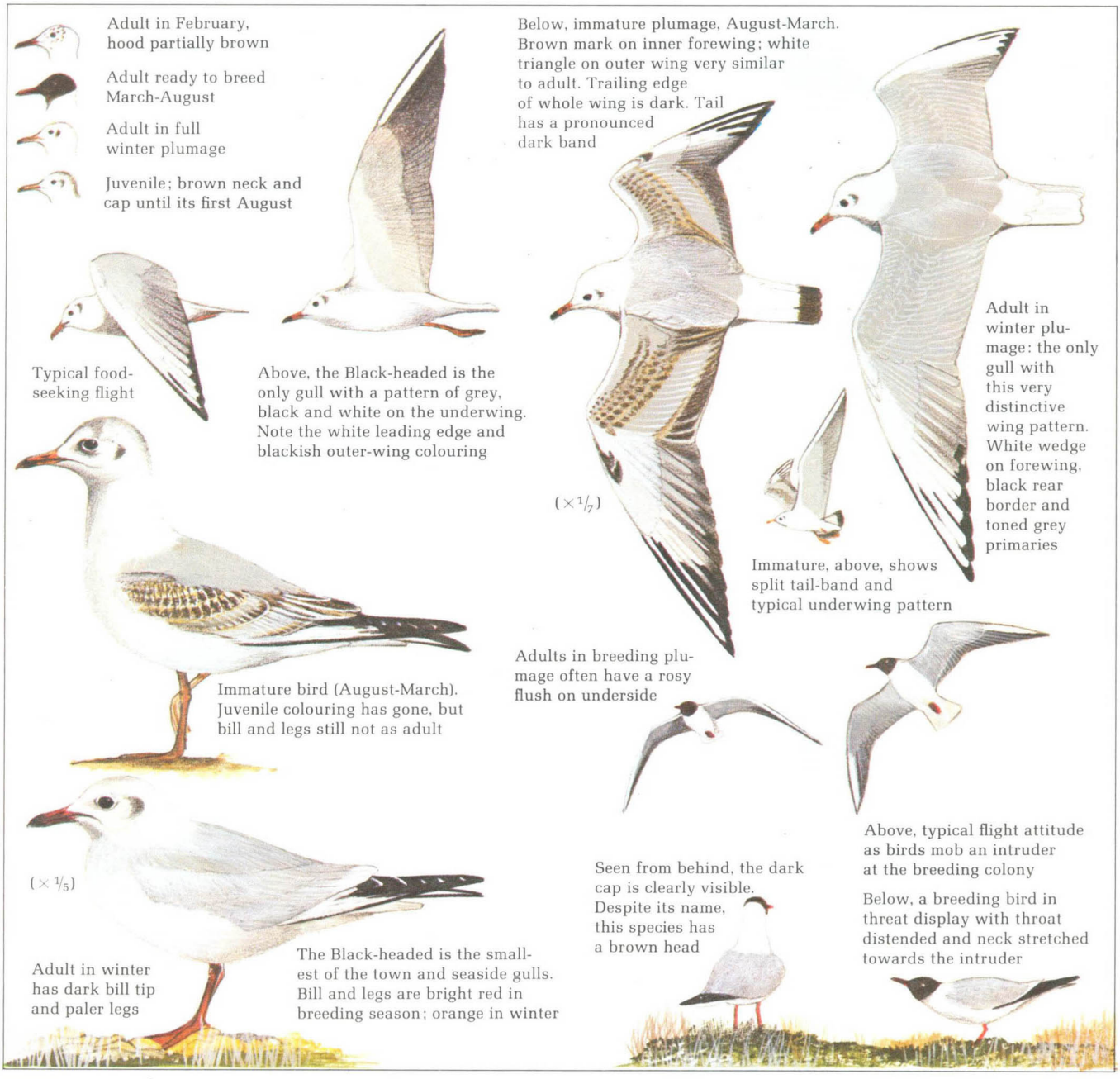
Lesser Black-backed Gull

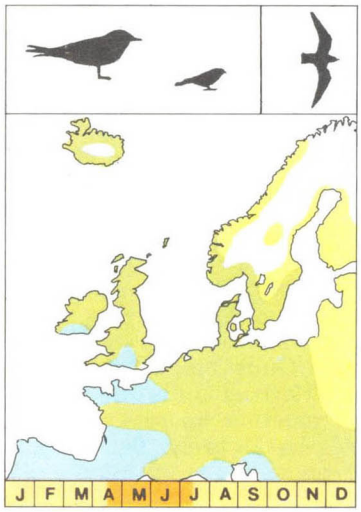


Lesser Black-backed and Herring Gulls are very closely related. When the Herring Gull's distribution is traced westwards around the Arctic, it is found to merge, by a series of increasingly dark races, with that of the Lesser Black-backed Gull. The two can thus be regarded as the extremes of a single variable species, maintaining their separate identities in an area of overlap. In Europe, they behave as separate species, sometimes nesting side by side, but each breeding only with its own kind. Even so, the barrier separating them is a fragile one; hybrids occasionally occur, and can be artificially induced by the simple expedient of exchanging eggs between Lesser Black-backed and Herring Gull nests. Changelings thus produced assume the identity of the foster species and in adult life will mate with the "wrong" species to produce hybrid offspring.

Not surprisingly, the two species are virtually identical in many of their habits. Lesser Black-backs do not feed on rubbish tips as often as Herring Gulls, but with them they add to the bird-strike menace at airports. For such a migratory bird, unexpectedly large winter roosts of Herring Gulls occur on several reservoirs in Britain. Black-backed Gulls' breeding sites are as varied as Herring Gulls', but where both occur together on rocky coasts, Lesser Black-backs prefer flat ground, while Herring Gulls predominate on cliff ledges.

Black-headed Gull



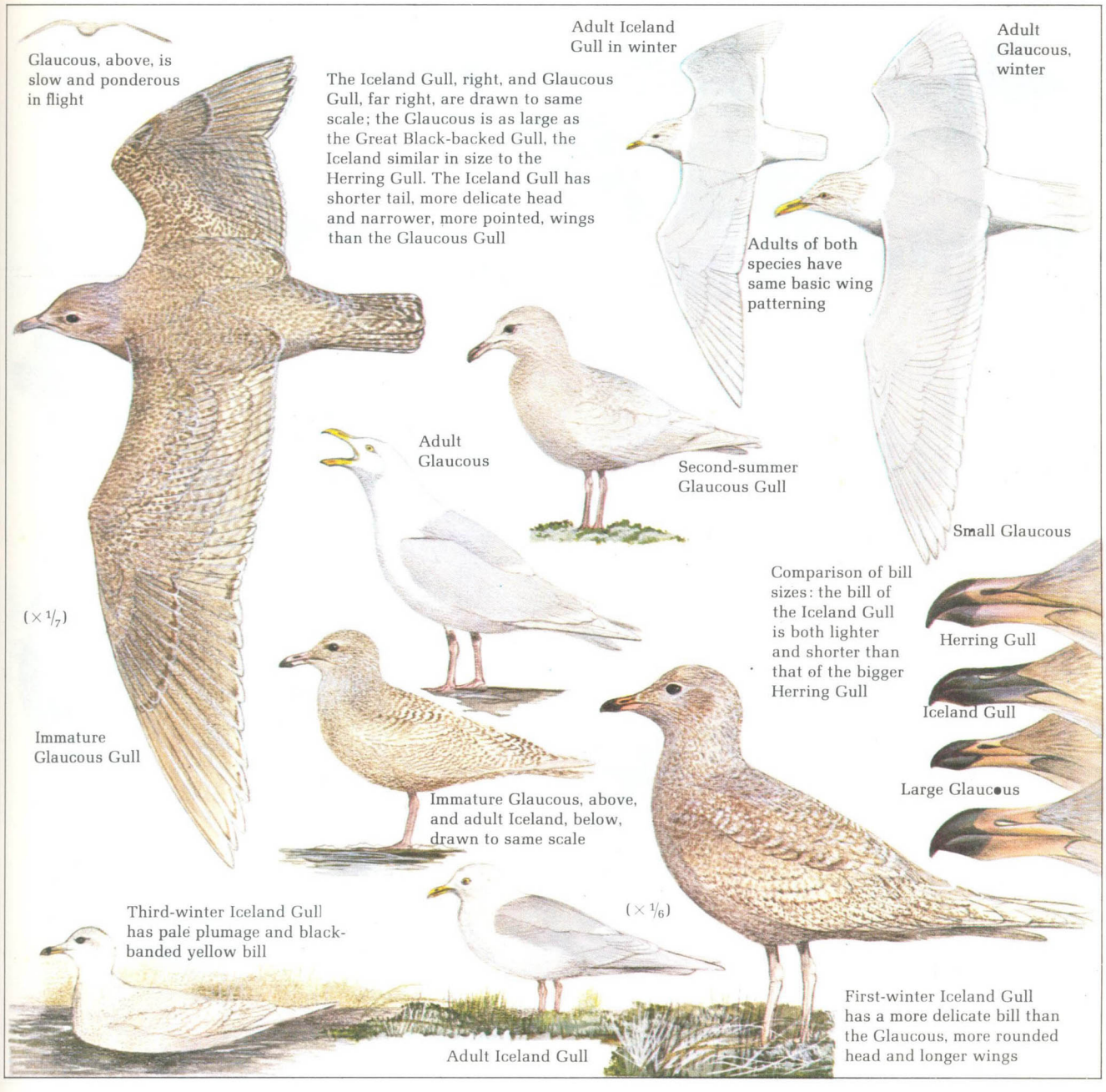


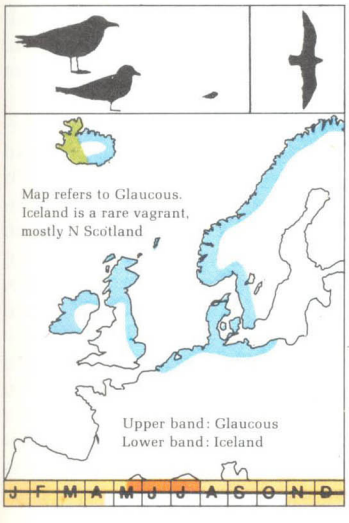
Many North American birds occur as vagrants in western Europe. Far fewer European birds stray against the prevailing winds west across the Atlantic, but the Black-headed Gull does so regularly. It seems likely that with the Little Gull, another wanderer from Europe, it will eventually breed there. This would seem to be the logical outcome of the Black-headed Gull's spectacular increase and range expansion in Europe during the past century. Even since 1900 it has increased a hundredfold in Sweden and Finland, and a survey of England and Wales in 1958 showed 27 per cent increase in 20 years.

Success of this kind is usually a result of a bird's rapid adaptation to the changes wrought by twentieth-century Man. This certainly seems true of the Black-headed Gull. Long known as a follower of the plough, it now benefits from playing fields, rubbish dumps, park lakes and even suburban gardens, gleaning rubbish and foraging for soil invertebrates. Once a rare bird in London, it is estimated that 192,000 roosted there during December 1968.

Breeding sites include marshes, saltings, sewage farms and gravel pits. Nests are closely grouped in colonies, sometimes of several thousand pairs. On marshy sites, some nests are built as floating structures amongst vegetation. Three eggs are usual, and incubation lasts 23 to 24 days. The young fledge at five to six weeks.

Glaucous Gull–Iceland Gull



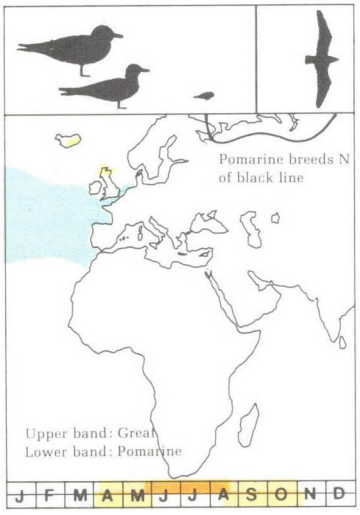


Relationships among some North Atlantic gulls have puzzled researchers. The Iceland Gull, for example, looks like a smaller edition of the Glaucous Gull, but its behaviour and habits resemble those of the Herring Gull, to which it is probably closely allied.

Glaucous Gulls are in many respects paler versions of the Great Black-backed Gull, which they approach closely in size. They show the combination of scavenging and predatory habits characteristic of typical gulls, the former practice being particularly a feature of Arctic seabirds. The Little Auk is perhaps its most frequent victim, often snapped up from one of the rafts of densely packed birds which stud the surface of the sea around a colony. Captured on the water in this way, it would be difficult for the Glaucous Gull to dismember a Little Auk, and usually it is swallowed whole. Arctic Tern chicks are also a common prey, though Glaucous Gulls find it difficult to penetrate far into a colony due to determined mobbing by parents. Alternatively, sea invertebrates and rubbish gleaned around human settlements may make up the diet.

Despite their name, Iceland Gulls breed only in Greenland and Arctic Canada. They winter in small numbers in the Baltic and around Britain. Although they indulge, like their larger relative, in predation and scavenging, fish, sometimes obtained by diving, form a major part of their diet.

Great Skua–Pomarine Skua

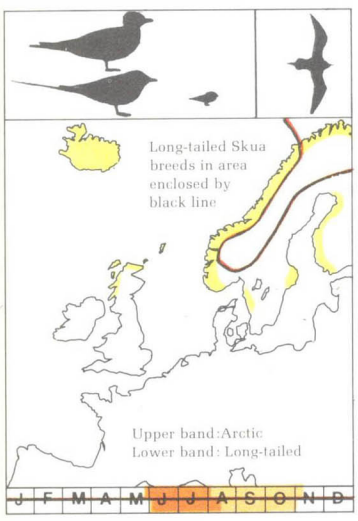


Skuas have perfected a feeding strategy which biologists term kleptoparasitism, but which the layman might prefer to call piracy. The technique consists simply of harrying other seabirds in the air to make them release food. Birds as large as Gannets may be pursued in this way.

The Great Skua not only uses this feeding method but is also a redoubtable predator, taking the eggs, young and adults of many species. It is recorded as having killed such formidable adversaries as the Grey Heron and Great Black-backed Gull. Many attacks are made in flight, sometimes resulting in injury to the aggressor itself, who may then fall victim to other Great Skuas ready to seize any opportunity of feeding, even it if involves cannibalism. The Puffin is a frequent victim, often captured as it emerges from the entrance of its burrow.

Open woodland is the breeding habitat, and nest sites vary from solitary to social. Territories are defended with great violence; even humans are subjected to low-level frontal attacks, the bird striking the head with trailing feet. The nest is a meagrely lined scrape, and the clutch usually contains two eggs. Both sexes incubate, the off-duty bird often maintaining a look-out from some eminence. Incubation lasts 28 to 30 days, and the young fledge in six to seven weeks. Great Skuas winter mainly in the North Atlantic but one Scottish-ringed bird was recovered in Guyana.

Arctic Skua–Long-tailed Skua

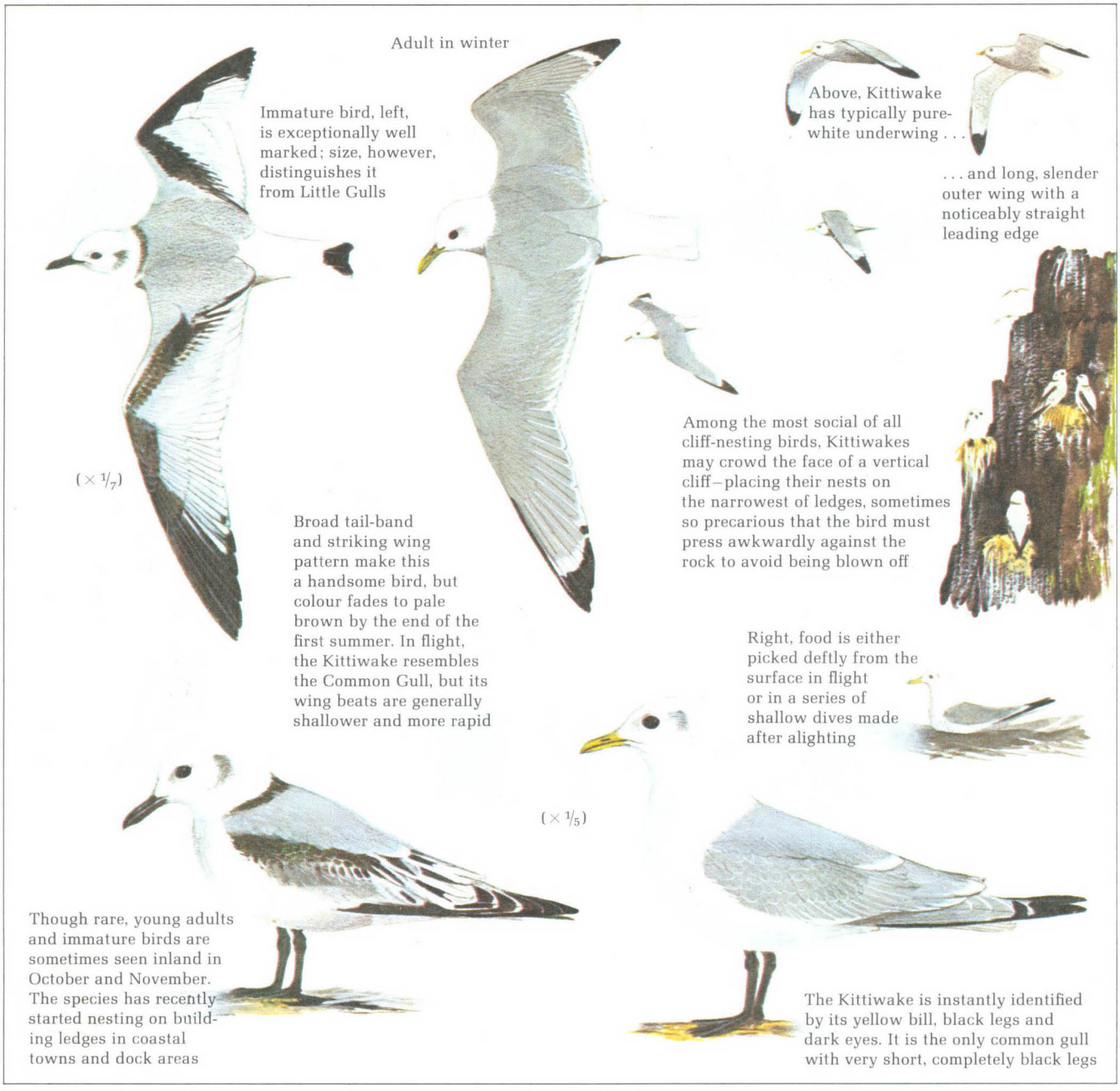


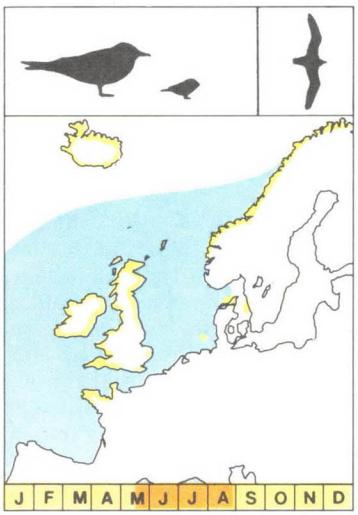
Two distinct colour phases exist within Arctic Skua populations, one with pale underparts, the other with dark. Proportions of the two vary geographically; in southern Norway and the Baltic most birds are dark, but the number of light-coloured birds increases with northerly latitude, and in northern Norway reach 90 per cent of the population. Light-coloured birds are numerous at Scottish colonies, especially in the Outer Hebrides. Arctic Skuas are more frequently piratical than Great Skuas, choosing terns and Kittiwakes as their main victims, although on tundra they feed largely on small rodents and birds.

Like Great Skuas they usually nest in loose colonies on open ground, and make determined attacks on all intruders. Off-duty or non-breeding birds frequently indulge in spectacular aerial chases over the breeding grounds. Birds usually breed for the first time at four years of age. The two eggs hatch in 26 days, and the young fledge after four to five weeks.

Long-tailed Skuas are the smallest and most graceful of their family, and are virtually always of the pale phase. They are Arctic or sub-Arctic breeders, whose nesting activity is closely related to the population cycles of lemmings, which form their main prey. Because they move straight out into the Atlantic rather than hugging the coasts, Long-tailed Skuas are much less often seen on migration than Arctic Skuas.

Kittiwake



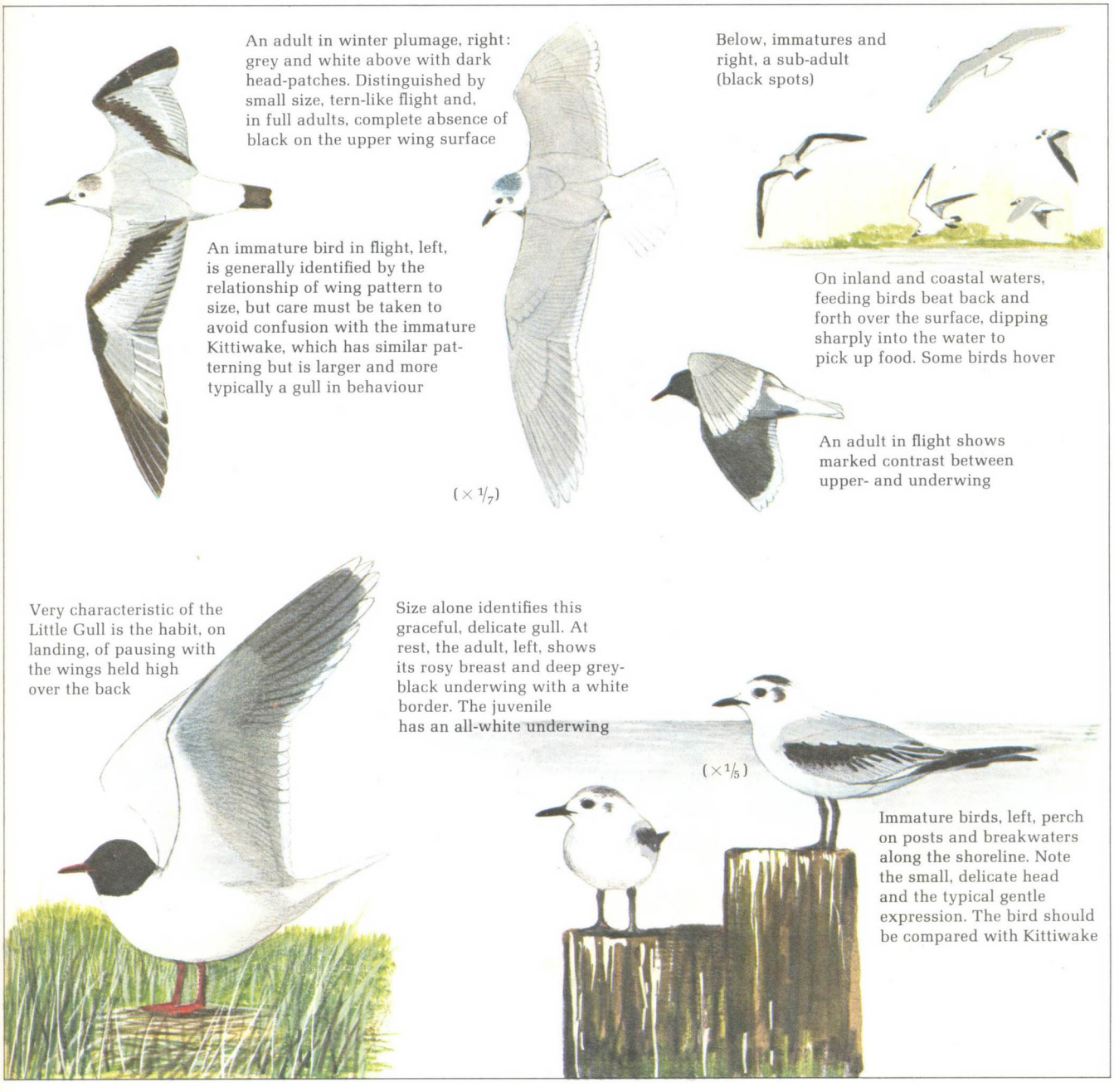


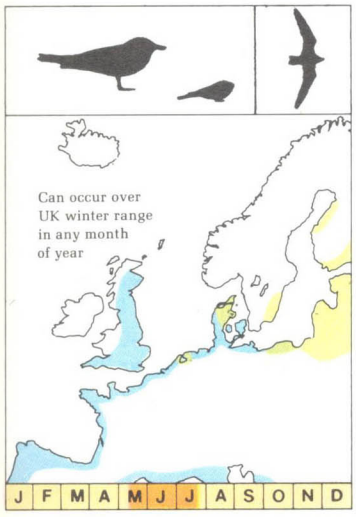
Adaptations for oceanic feeding and cliff-ledge nesting make the Kittiwake a very distinctive gull. Spending little time on land, its legs are relatively short and lack the hind toe. Fish are its food in the breeding season and surface invertebrates during wintertime oceanic wanderings.

In common with several species of gull, and with the Fulmar, Kittiwakes have increased enormously during the twentieth century. It is astonishing that this increase went unnoticed until 1959, when a careful census in Britain was compared with past records. The results indicated an increase of about 50 per cent every ten years, and a census in 1969 showed the growth rate still being maintained. On British coasts about half a million pairs now breed, and the increase also has been noted all round the North Sea. Such a population explosion was probably overlooked because, until recently, growth was mainly confined to existing colonies, with few new ones being established. While other gulls have increased by capitalizing on the side effects of industrial society, the Kittiwake has benefited from the cessation of human exploitation: eggs were plundered and adults shot on a large scale during the nineteenth century.

Kittiwake nests are built on a foundation of green seaweeds, cemented to a cliff ledge with guano – or to the window ledges of waterside buildings in British and Norwegian towns.

Little Gull



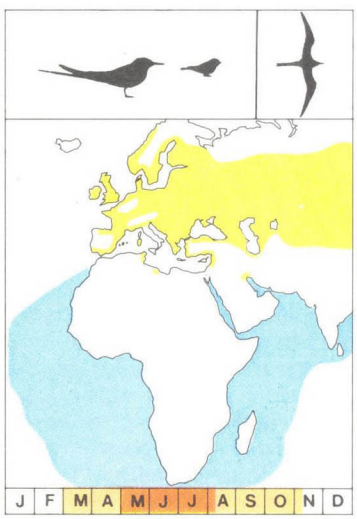


Curiously patchy distribution and baffling migratory patterns characterize this the smallest of the gulls.

Most of its breeding range lies in the USSR, split into three distinct regions. In Europe, it breeds at only a very few scattered outposts no farther west than Holland. The winter range is mainly around the Black Sea and Mediterranean, but some occur on the North Sea and Atlantic coasts of Europe. Here, occurrences are inexplicably irregular, flocks of some hundreds inhabiting certain Scottish localities in autumn, but only isolated individuals appearing in England. Strangest of all, the Little Gull is a regular vagrant to the eastern seaboard of North America, and now breeds there in small numbers.

Both in habits and flight action, the Little Gull much resembles marsh terns, such as the Black Tern, in whose company it often nests. Breeding habitats are marshes and swampy grasslands with plenty of open water rich in the insect life on which it feeds. Outside the breeding season, sustenance is small fish and crustaceans. Most colonies contain less than 50 pairs, though larger ones occur where the species is more widely distributed. Nests, usually quite large structures of grass, are sited amongst rushes or similar emergent water plants. Two or three eggs form a normal clutch, but up to seven have been recorded. Young birds leave the colony with their parents in family parties which later disperse.

Common Tern



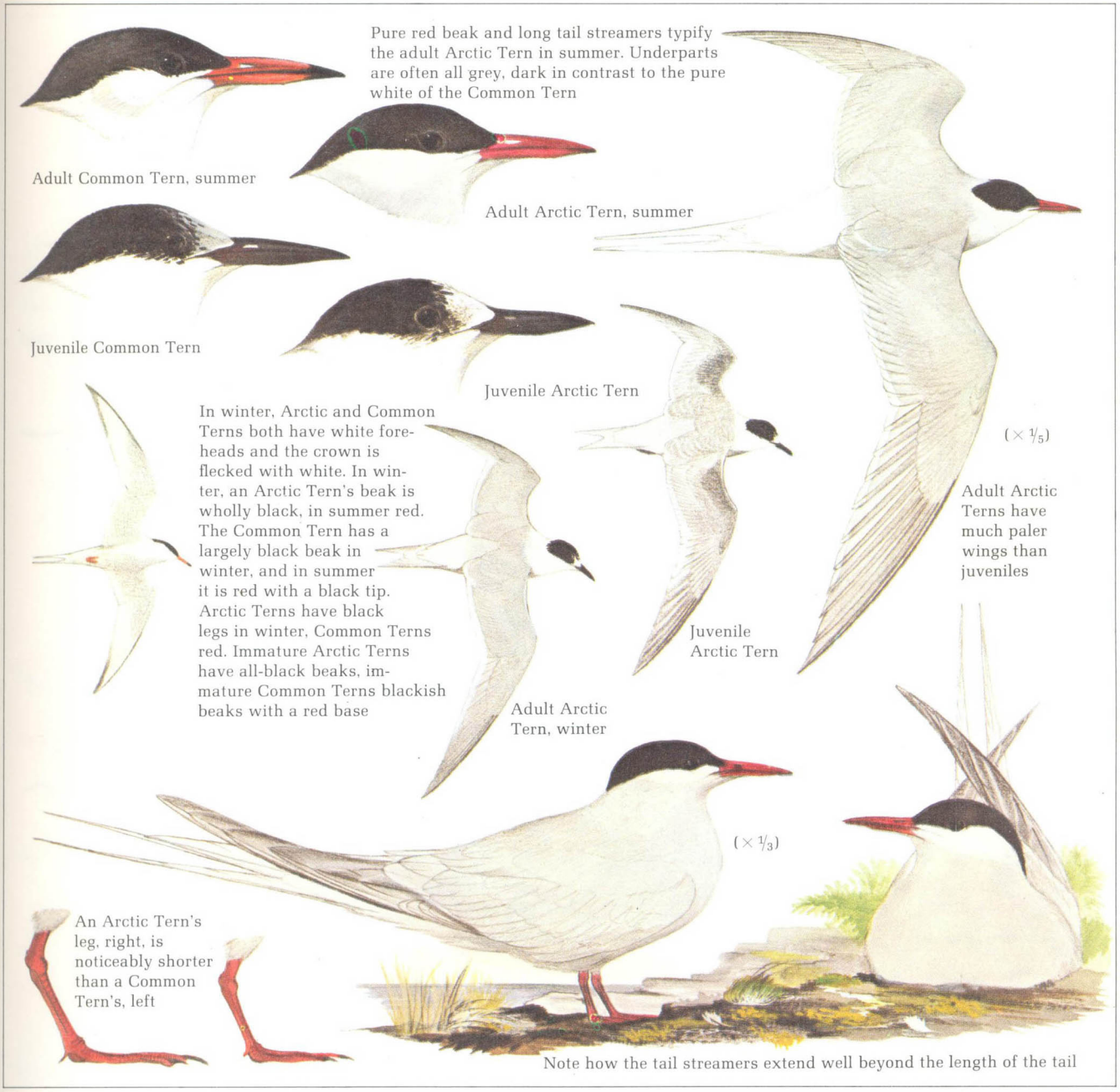
Common and Arctic Terns share many features: see facing page. The Common Tern's breeding range starts at the southern limit of the Arctic Tern's – some mixed colonies occur, but the zone of overlap is small. Not only does the Common Tern breed on Mediterranean as well as North Sea shores, it also ranges inland, with colonies on many wetland areas far from the sea – even at 14,000 feet in Tibet.

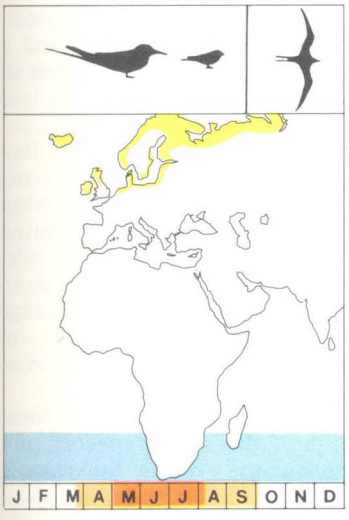
Colonies, especially inland, are often small – occasional pairs nesting even on artificial sites on inland waters. Mobbing (i.e. nest defence) is less vicious than by the Arctic Tern.

Common Terns feed in fresh water or close inshore (the Arctic fishes well out to sea) and thus take more insects and crustaceans; whitebait is a favoured fish. Its insect-catching techniques over water resemble the Black Tern's and craneflies are taken over land.

During courtship, a male flies around with a fish in its beak, which is presented to a prospective partner. In both species, young are kept in the nest for the first few days with one parent in attendance. Thereafter they leave the nest and hide in nearby vegetation, allowing both partners to fish for them. In dense colonies, robbing of fish is common; pairs which have lost their own young are prime culprits. Sometimes up to 12 birds will harry a single parent, when it will be lucky to get one in ten fish to each chick.

Arctic Tern





To enter an Arctic Tern colony is unnerving; birds regularly strike an observer's head, and may even draw blood. Colonies, sometimes thousands strong, are often tenanted by other nesting birds, such as Eiders, which gain security from the Tern's efficient mobbing of gulls and foxes. The clamour of the birds is interrupted at intervals by brief, eerie spells of silence, while the terns sweep out to sea in a massed flock – a phenomenon known as a "dread". Colonies are sited on rocky islets, beaches, or short turf, always close to the sea. Arctic Terns take up to five years to establish themselves in the breeding colony; thereafter, one or two chicks may be raised from the clutch of two or three eggs.

It has been calculated that the Arctic Tern enjoys a greater amount of daylight than any other animal. Breeding around the shores of the Arctic Ocean and northern Atlantic and Pacific it migrates to spend our winter in the Antarctic summer, remaining in the region of maximum day length all the year round. Birds ringed in Britain have been recovered in Australia. On average, Arctic Terns cover some 20,000 miles a year on migration alone; the oldest-known bird reached 27 years, so a lifetime's mileage may exceed a return trip to the moon.

The rapid moult necessitated by such long migrations occurs in the Antarctic, where food-rich waters replenish energy for the return flight.

Little Tern

Its small size, yellow legs and black-tipped yellow beak all reliably identify the Little Tern in the field. At a distance the hurried flight separates it from its larger relatives

Winter

Summer

In winter, the black crown recedes and becomes flecked with grey. In summer, adult Little Terns are the only European Sea Terns retaining a white forehead

When Little and Common Terns are together, the Little Tern can be distinguished by its dumpy body and tail with a shallow notch and short streamers. The Little Tern also has a distinctive flight pattern: it hovers on rapidly flicking wings with head held low before taking the plunge

Above: a black eye-stripe running from crown to beak develops in summer

Below, the Little Tern's typical hurried flight on rapidly beating wings

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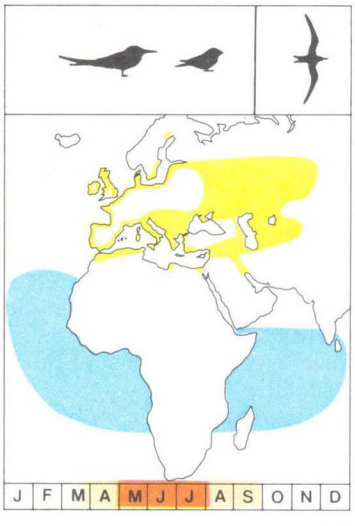
Above: a face-on view of the head pattern. Centre: a female settles on her eggs. Right: the male brings a sand-eel to a chick at the very exposed nest



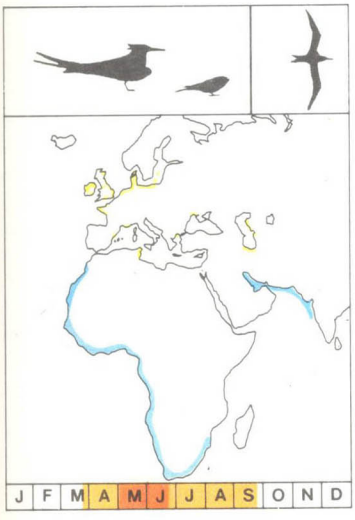
Smallest of the European sea terns, the Little Tern has the widest breeding range, nesting in every continent. In Britain it is widespread but almost exclusively coastal, breeding in small scattered colonies on sandy beaches or shingle spits. Elsewhere, sand bars on inland waters are also regularly used.

The American population of Little Terns suffered badly last century from slaughter for the millinery trade. A new danger now threatens in many parts of the world, for its nesting grounds are the same open beaches beloved of holidaymakers. The two or three eggs in their scrape are so well camouflaged that humans crush them underfoot or cause desertion by disturbance: less bold in defence of their nests than Common or Arctic Terns, their protesting calls go unnoticed. Though still a regular sight on our coasts, the British population is dangerously low at less than 2,000 pairs.

Little Terns feed close inshore, often in tidal creeks and pools, hovering more and flying with quicker wing beats than other terns. Rarely nesting more than a few yards from the tideline, mortality from wind-blown sand and foam is added to the damage caused by disturbance. The diet includes small crustaceans and worms, sand eels and whitebait.

On migration, Little Terns join local populations of their own species, and this makes their precise movements difficult to determine.

Sandwich Tern—Gull-billed Tern



The densely packed coastal colonies of this large and handsome tern are exciting to visit – a hubbub of grating calls. Observers should however approach with care, since birds can be frightened right away especially when reconnoitring early in the season.

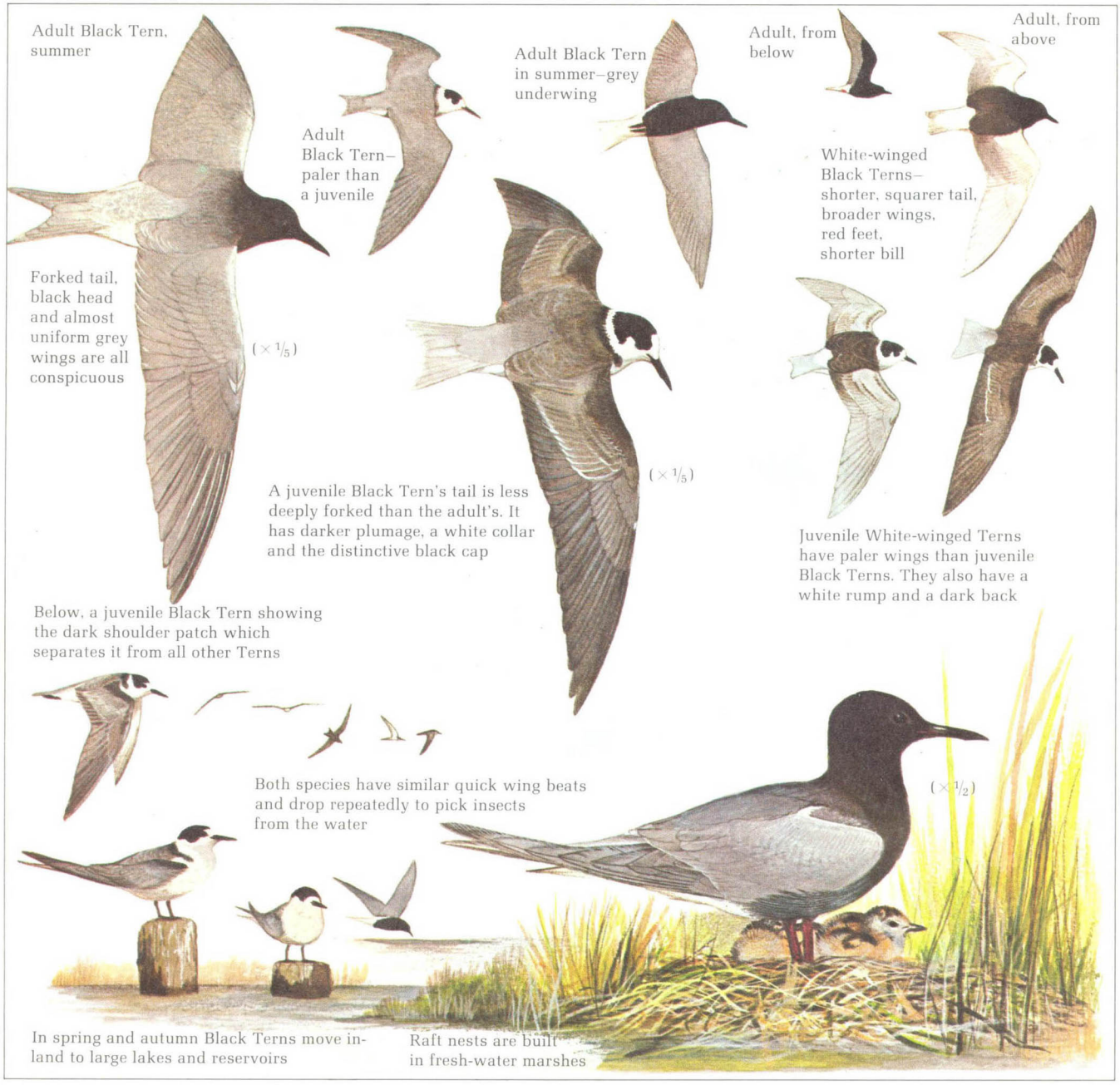
First-comers select a site for the colony, within which are "sub-colonies" whose members show close synchronization of breeding times – an adaptation conferring high breeding success. Less aggressive than Common or Arctic Terns, Sandwich Terns often nest close to them, or to Black-headed Gulls, benefiting from their neighbours' zeal in mobbing intruders.

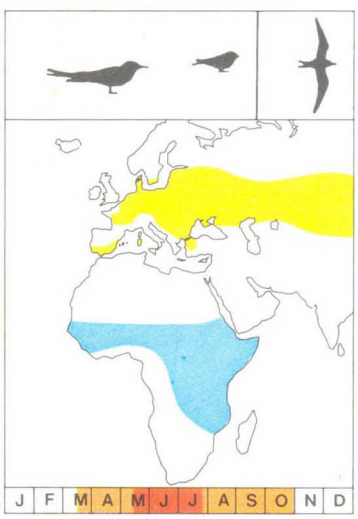
In early spring, aerial displays are frequent, small groups flying to great heights before planing down, calling. One or two eggs are laid in May and incubated for three to four weeks Staple food for chicks and adults is fish, especially sand-eels and sprats.

Sandwich Terns dive deeper and from greater heights than smaller species. Their feeding range may be wide: a tag from a young salmon appeared at a Scottish colony just 48 hours after the fish was marked 42 miles away. They are highly mobile birds, extensive interchange taking place between different European countries.

Gull-billed Terns resemble Sandwich Terns in size and general appearance, but have a heavy, all-black bill. They are inland birds, feeding mainly on insects.

Black Tern



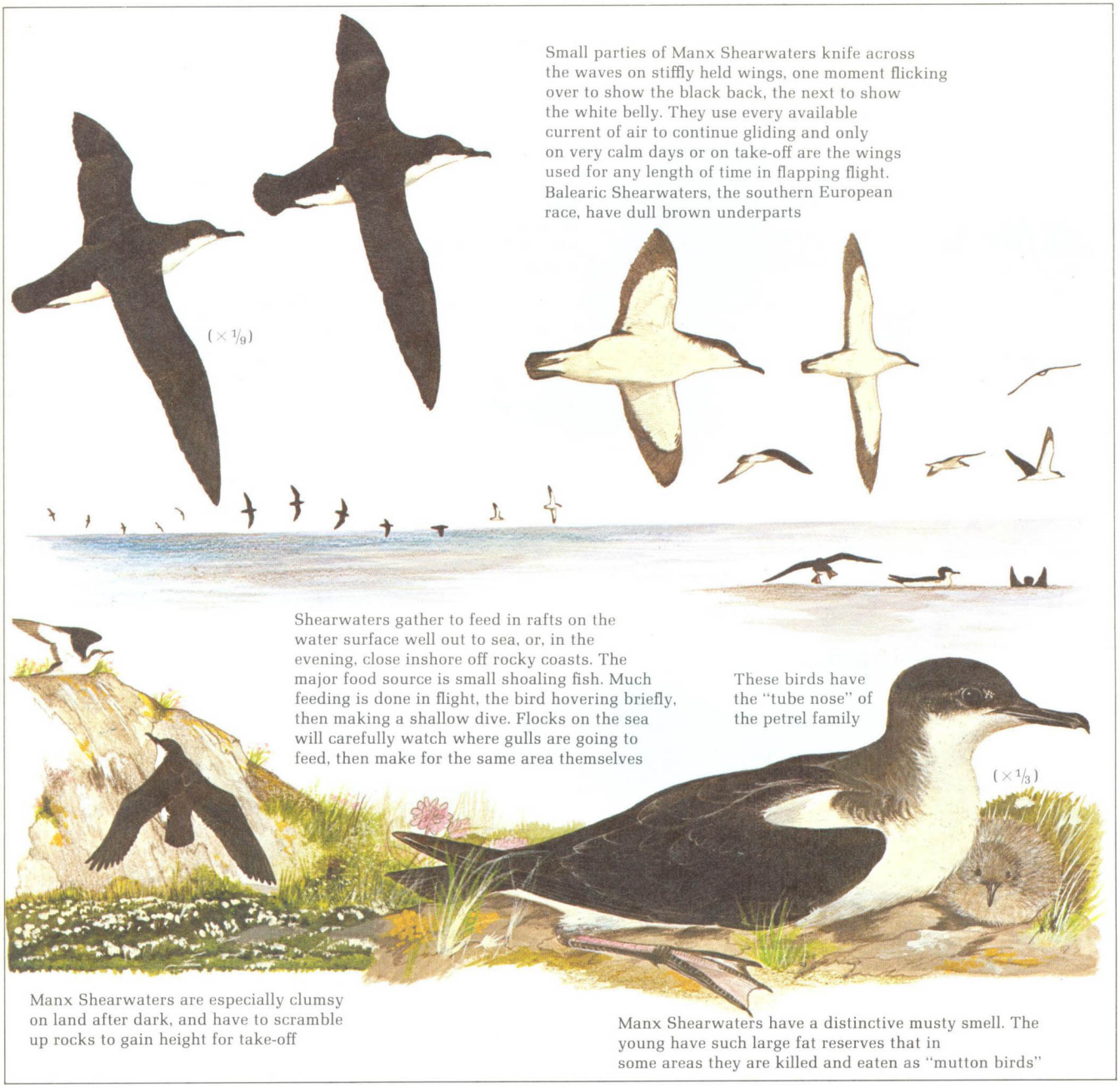


Widely distributed throughout the world, Black Terns breed on flooded marshland, where they have the benefit of a mosaic of open water and vegetation. Here, aquatic insects abound, which the birds pick from the surface in flight. Unlike Sea Terns, Black Terns are unwilling to plunge and rarely take fish, though unwary tadpoles and frogs may fall victim.

Black Terns patrol suitable waters in groups, calling frequently. During courtship, display flights occur: one resembles the fish flight of Sea Terns without the fish; another starts with several birds circling high and calling, finally breaking off in small groups, which glide down on set wings. Their nests are floating piles of weed or rushes, but some are built in sedge clumps. Both sexes incubate the two or three eggs, and displays occur at the nest, notably the "stooping" male posture, bill pointing downwards, wings and tail stretched up in line with it. Hatching after three weeks, chicks stay in the nest for over a week before moving into the surrounding vegetation, where they are fed by their parents for four or more weeks, even when able to fly. Eurasian Black Terns breed east to the River Yenisey, in the USSR, but winter entirely in tropical Africa, mainly north of the equator.

Black Terns ceased to breed regularly in Britain in 1885, but have nested again several times since the Second World War.

Manx Shearwater



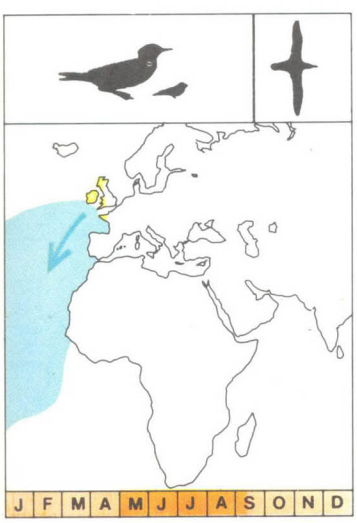
Small parties of Manx Shearwaters knife across the waves on stiffly held wings, one moment flicking over to show the black back, the next to show the white belly. They use every available current of air to continue gliding and only on very calm days or on take-off are the wings used for any length of time in flapping flight. Balearic Shearwaters, the southern European race, have dull brown underparts

Shearwaters gather to feed in rafts on the water surface well out to sea, or, in the evening, close inshore off rocky coasts. The major food source is small shoaling fish. Much feeding is done in flight, the bird hovering briefly, then making a shallow dive. Flocks on the sea will carefully watch where gulls are going to feed, then make for the same area themselves

These birds have the "tube nose" of the petrel family

Manx Shearwaters are especially clumsy on land after dark, and have to scramble up rocks to gain height for take-off

Manx Shearwaters have a distinctive musty smell. The young have such large fat reserves that in some areas they are killed and eaten as "mutton birds"

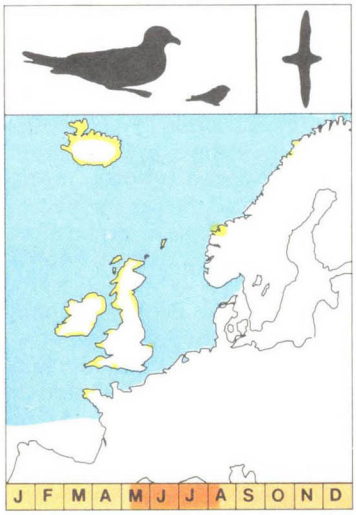


An ocean wanderer on a global scale, yet easily accessible at its breeding colonies, the Manx Shearwater is one of the most intensively studied seabirds. It nests in burrows on inshore islands, visiting and courtship taking place at night to the accompaniment of unearthly screams and cackles. Manx Shearwaters eat small fish taken from the sea surface, and may feed at great distances from the colony. Their homing ability is spectacular: Shearwaters transported to Boston, USA, from Skokholm, off the south coast of Wales, were back at the colony in 12½ days. Adults leave the colony to feed for some ten days before egg laying in early May, and thereafter the parents alternate continuous incubation spells of a week or more. The single white egg hatches after seven or eight weeks. Both parents feed the chick by regurgitation.

The colony is quietest and visits slacken during full moon. Feeding intervals up to three days are common. The fledgling is deserted at two months, and a week or so later makes its way to the sea. Manx Shearwaters breed first at five or six years, and may live for a further 20 or more.

The introduction of Brown Rats to breeding islands has reduced or extinguished many colonies. Britain (at least 175,000 pairs) is the stronghold in western Europe, but other races nest in the Mediterranean and Pacific. North Atlantic birds normally winter off Rio de Janiero.

Fulmar

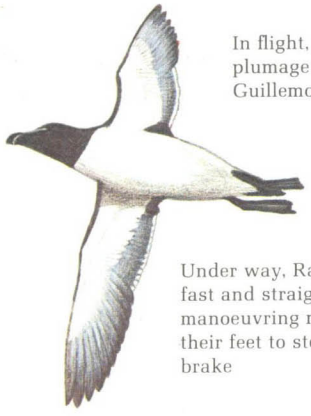


With its ghost-grey plumage and mastery of flight, an aura of romance surrounds this outstandingly successful seabird. Until 1878 its only known British colony was on remote St Kilda. Then a few pairs were found in the Shetlands, and it has since spread right round Britain, where recent surveys put the number of occupied nest sites at 305,000. The expansion started while many island communities still harvested Fulmars for flesh, oil and feathers.

The Fulmar's success has probably been based on human activities – first whaling, and later commercial fishing, both producing much waste offal, on which Fulmars feed. Its expansion seems surprising since only a single egg is laid each year, and breeding does not start until the age of seven or eight. This is offset by a life-span of 25 years.

Fulmars return to the breeding cliffs in November or December from extensive wanderings in the North Atlantic, but do not nest until May. Pairs leave the colony for a fortnight's "honeymoon" prior to laying in order to build up food reserves. Courtship involves gaping and an incredible cackling chorus. Chicks are fed on regurgitated food and stomach oil. The distinctive musty smell, common to petrels, lingers even on stuffed birds 100 years old. After seven weeks on the ledge, the chick weighs more than an adult and is ready to leave. The parents cease feeding it a few days before its departure.

Razorbill

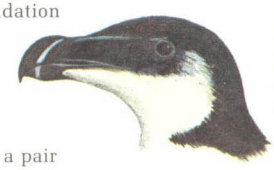


In flight, an adult with summer plumage shows a dark head. The Guillemot has a very similar profile

Under way, Razorbills fly fast and straight, but while manoeuvring must extend their feet to steer or to brake

Juvenile

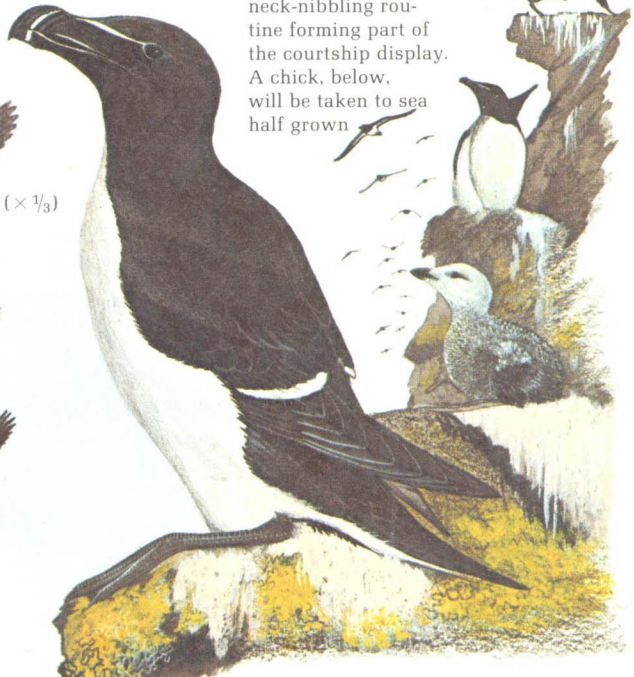
The main function of the handsome black and white horny beak of the adult is probably as a courtship embellishment. In winter, it is replaced by a smaller sheath on the same skullbone foundation



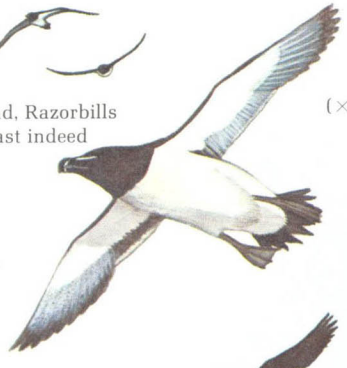
Adult, winter

On the cliff, a pair indulge in mutual preening, a gentle neck-nibbling routine forming part of the courtship display. A chick, below, will be taken to sea half grown

Adult, summer



Downwind, Razorbills fly very fast indeed



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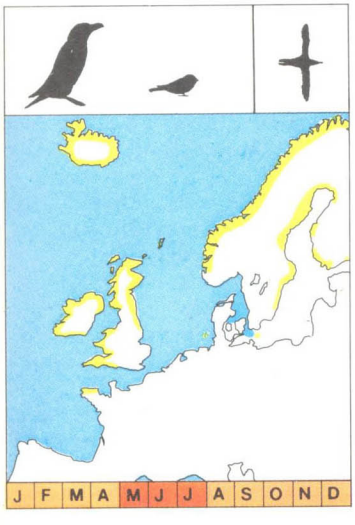
Razorbills are difficult to distinguish from Guillemots in winter as they fly past low over the waves a few hundred yards from the shore: at this time the different shapes of the beaks are less marked

Wings held stiffly, feet spread to slow it down, a Razorbill descends to the sea from the cliff. Several attempts at landing may be made on windy days

Razorbills dive from the surface, using wings and feet under water

The bird is aptly enough named. Its beak is both sharp and heavy, and the vertical white bar sets the Razorbill apart from the Guillemot. Minute furry feathers form the white stripe running from eye to beak

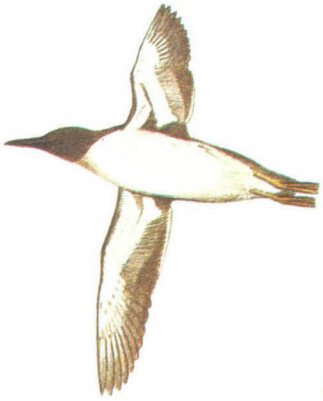


With its deep, compressed bill, this bird resembles a smaller version of its extinct, flightless relative, the Great Auk. It nests in small caves in cliffs, or among boulders and scree, usually on uninhabited islands. Ledge nests are rare. Though similarly coloured, the single egg is more rounded than the Guillemot's. Although their nests are less vulnerable, Razorbills, like Guillemots, take their 18-day-old half-grown young to sea at dusk. The chick is fed with a beakful of small fish – Guillemots give longer, single fish. Sand eels, sprats, crustaceans and molluscs figure in the diet.

Razorbills return to their breeding areas from January onwards. Prior to nesting, displays occur on the sea near the colony. Line ahead formation swimming and mass diving are seen, and pairs circle round one another on the water. After moving onshore, "billing" and head shaking – bill open to show the yellow interior – are frequent, and birds often leave the cliffs with a slow-motion "butterfly flight". They are noisy, and have a deep-throated call which is similar to that of the Guillemot.

In pre-Roman times, Razorbills were eaten by maritime tribesmen. Today, they are threatened by oil pollution and by fishermen who feel that Razorbills and other auks are competing for the commercial harvest of the seas. Nevertheless, their numbers appear to have decreased less than those of the Guillemots and Puffins.

Guillemot—Black Guillemot



In summer, Guillemots show a dark head and neck while flying. Black Guillemots, below left, are unmistakable in summer plumage. In winter, Guillemots can be difficult to tell from Razorbills as they fly past low over the waves usually a few hundred yards from the shore: at this time the different shapes of the beaks are less marked

"Bridled" head marking

"Bridled" marking, winter

The "bridled" marking, above, running back from the eye, is found in most colonies, though more frequently in the north. In winter, the throat and cheeks show more white

Adult Black Guillemot

Juvenile Black Guillemot. An adult in winter plumage is similar but has red feet

(×1/3)

Adult Black Guillemots

Juvenile Black Guillemot, winter

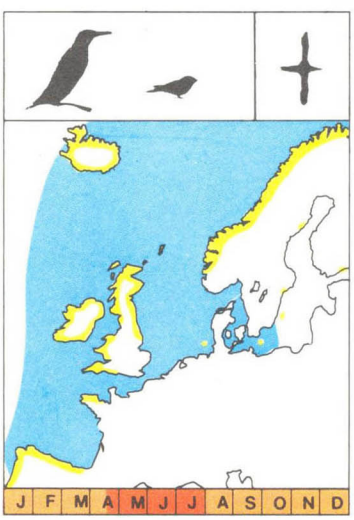
In winter, a complete reversal of plumage colouring takes place in the Black Guillemots, upperparts become grey, underparts white

Guillemots in winter plumage flying at speed, low over sea

Birds gather in loose rafts inshore and make shallow hunting dives from the surface. Below left, adult Guillemot, summer

Adult Guillemot, winter

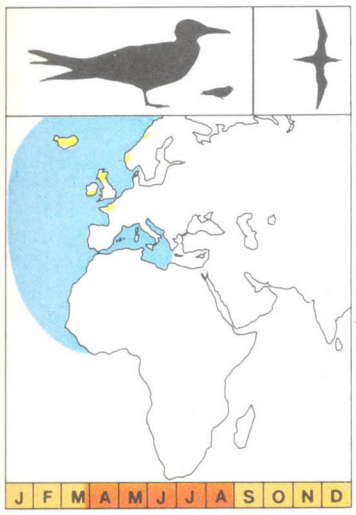
Guillemots are distinguished from Razorbills by their larger size and slender, dagger-shaped beak. The chocolate colour also sets them apart, except in northernmost Europe, where the Guillemot is black. The egg, superbly adapted to cliff life, rolls around its centre of gravity when disturbed, rather than over the ledge



Guillemots nest in dense colonies on tops of sea stacks and cliff ledges. Seen close to, their heads seem to be continually bowing and their displays sometimes resemble the Razorbill's. A cacophony of trumpeting calls continually rises from the colony. They panic easily, and many chicks are lost in the scramble following disturbance. Eggs are more secure: their conical shape means they spin on one spot rather than roll over the ledge, and they are made additionally safe by their coating of guano. They even become more stable as incubation proceeds, the centre of gravity shifting towards the narrow end. Nevertheless, marauding gulls account for any untended egg or chick, and mortality is high. Chicks are fed on single large fish, given head first. So hazardous is life on the cliff that chicks depart half grown, using spread feet and whirring wings to slow their descent. They leave at dusk (to avoid predators), parents in attendance, then move out to sea to feed.

Black Guillemots are smaller and much less numerous, breeding singly or in groups, scattered round rocky coasts. Displays include water dances and underwater chases in which the vermilion foot may be important. Cavities among boulders or cliffs are usual nest sites and they are the only European auks to lay two eggs. Greater site safety is reflected in the longer stay of the chick, over twice as long as that of the Guillemot.

Gannet



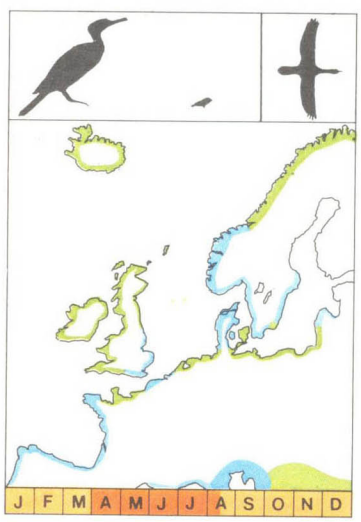
The Gannet is a species on the increase. Considering it only lays one egg a year and takes up to five years to reach breeding age, its success is astonishing. One possible reason is the increased availability of fish offal from trawlers, another that the taking of young birds for human food has almost ceased.

The nest is a conical mound of seaweed and flotsam, cemented with guano. Both parents incubate, covering the egg with the feet because a brood patch is lacking. The chicks are in the nest for some 15 weeks, fed on regurgitated fish. When ready to leave they weigh more than adults, the reserve tiding them over the first week or two of independence. This extra weight made them desirable food for human communities on isolated islands, and in some places they are still harvested. By contrast, their tropical cousins, the boobies, leave the nest after 12 weeks, but remain with their parents, being taught to fish for several months.

Colonies, usually on isolated offshore rocks, are often large: Boreray, off the Outer Hebrides, has over 70,000 pairs. When the young are well grown, a colony of this size will consume well over 100 tons of fish daily, including herring, mackerel and whiting.

Gannets migrate farthest in their first year, reaching West African waters. Sub-adults move less far south, wintering in the Mediterranean and Biscay. Adults disperse through home waters outside the breeding season.

Cormorant

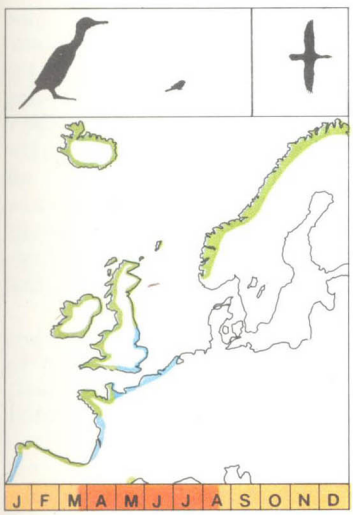


A bird of world-wide distribution, the Cormorant is common in coastal waters and on some inland lakes and reservoirs. Most colonies are on low, rocky islets, but inland, trees are often used, which soon die as a result of the guano deposits. Its nest is a heap of seaweed or branches lined with finer material, and the three or four chalky blue eggs are incubated for about a month, hatching to reveal naked and reptilian-looking youngsters. Two months elapse before they can fly.

Cormorants are skilled fishers, diving for 20 to 30 seconds to fish near the bottom at up to five fathoms depth, keeping wings closed under water. On coasts they are particularly fond of flatfish, and are estimated to catch up to two pounds of fish per day. As a result, they can come into conflict with fishermen, and bounties are sometimes paid on them. In open sea, the Cormorants' effect on fish stocks is probably small, but may be more significant in enclosed waters – though in some lakes they benefit salmon stocks by concentrating on fish which eat young salmon. In China, Cormorants have been trained to fish for Man for at least 1,000 years, and the Stuart Kings of England also employed them. The birds are kept on a long lead with a leather collar, which prevents fish being swallowed.

Cormorants do not undertake clearly marked migrations, but disperse up to several hundred miles after breeding. Populations appear fairly stable.

Shag



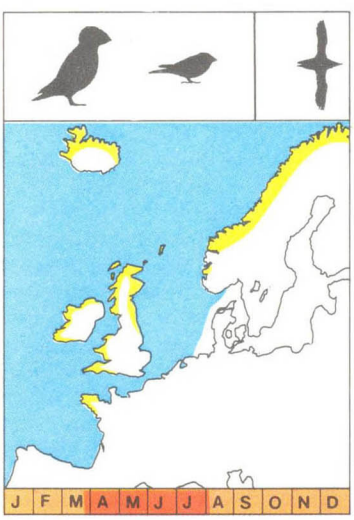
Smaller and slimmer than Cormorants, adult Shags are dark all over except for the yellow face patch. A metallic sheen on the feathers has given rise to the name "Green Cormorant". Like Cormorants, Shags are usually silent except at breeding or roosting sites, where growling calls are uttered.

Shags are more maritime than Cormorants, restricted largely to rocky coasts. Birds found inland are usually storm-blown victims of autumn gales – with a curious propensity for landing in busy streets and other unlikely places.

The nest is an exceedingly smelly pile of rotting seaweed, low on a cliff or cave ledge, or in a cavity under boulders. Protection from spray (which can fatally chill young) or from waves is of paramount importance. Competition for sites may be intense and inexperienced young birds often have their nests washed away. Nesting commonly starts in late February, but sometimes much earlier: laying has been recorded on November 20. The clutch usually contains three eggs. Generally, breeding is timed to hatch the young during the period of maximum abundance of food.

Shags disperse from breeding sites in the same way as Cormorants, but usually move less far. Populations have increased in many areas, though local catastrophes can occur as in 1968, when poisoning by an abnormal growth of dinoflagellate algae (a "red tide") killed large numbers of Shags on the north-eastern coast of England.

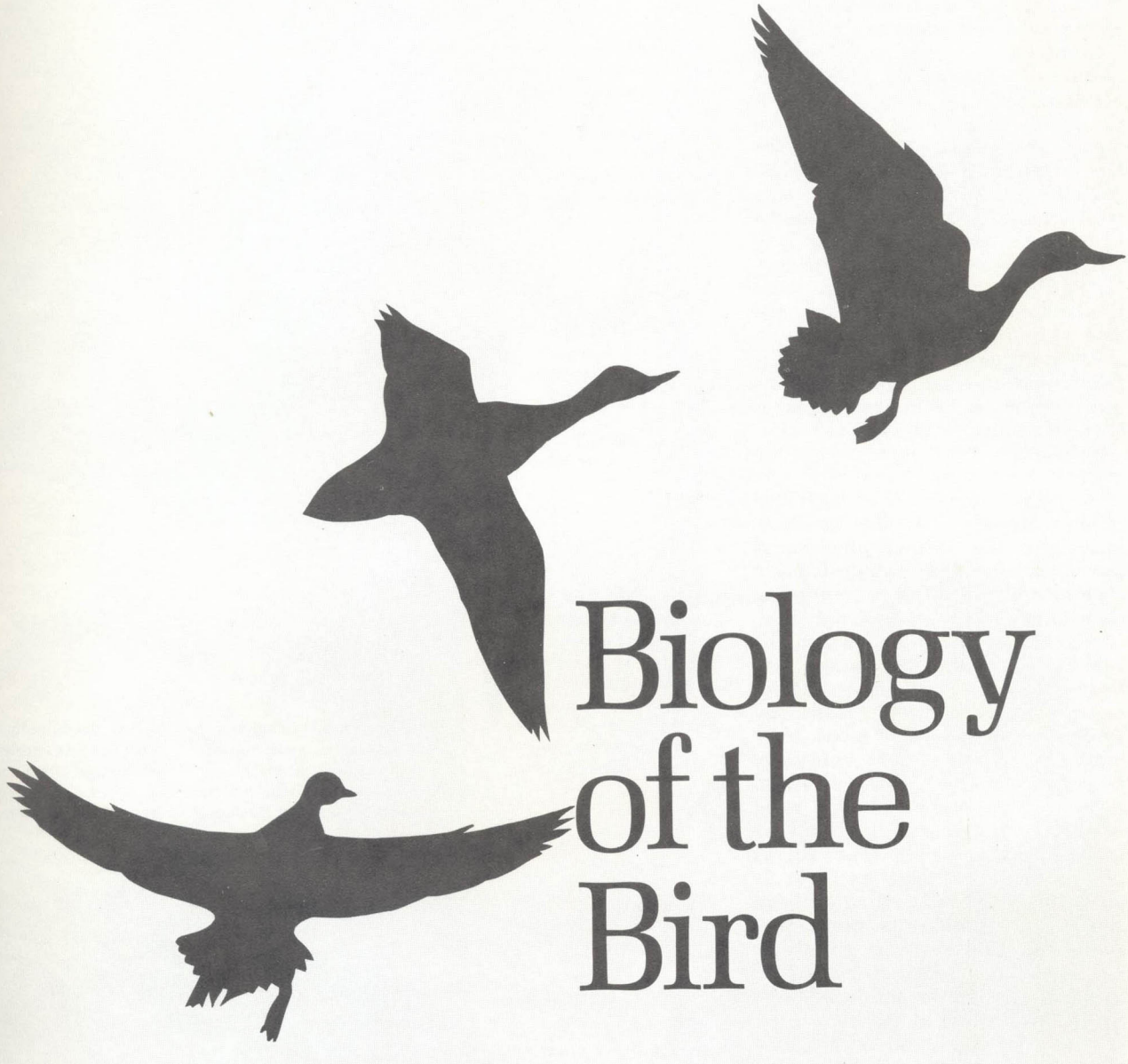
Puffin



Puffins are probably the best known of all seabirds, and their comical appearance is familiar to many who have never seen one in the flesh. Yet despite the affection in which it is held, the Puffin's numbers have been decreasing.

Puffins nest colonially in burrows lined with dry grass on soft ground at the top of rocky islands. The birds arrive in early spring, numbers building up just offshore for some days before flying on to the land *en masse*. Courtship involves much clashing of the brightly coloured bills, and furious fights occasionally take place. A single white egg is laid, and both parents incubate in turn through the six weeks it takes to hatch. The chick is fed on sand eels, whiting and sprats brought in beakfuls of up to 11 at a time. Like many seabird young, it fasts for about a week, using up fat reserves after the parents leave it at six weeks old. Young Puffins need a good drop to enable them to make their first flight, and during the (sometimes long) walk to a take-off point they are very vulnerable to predators. Although the journey is usually made in the dim visibility of dusk, Great Black-backed Gulls and Great Skuas still take their toll.

But predation alone does not explain the Puffin's decline, and pollution by chemical wastes and oil are also likely causes. The question requires much more research, which is made difficult by the fact that puffins winter far out to sea. When they die, they sink.



Biology of the Bird

Anatomy of a Bird

Of all forms of animal locomotion flight is perhaps the most demanding, imposing severe restrictions on size and body form. For this reason, birds show greater uniformity of structure than, say, mammals or reptiles, and even the largest birds are still dwarfed by giants among land and water animals.

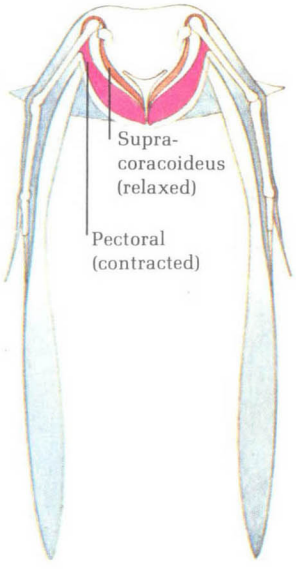
Lightness is crucial, and although some bulky structures, such as the massive flight muscles, are indispensable, they must be concentrated as close as possible to the bird's centre of gravity. Nearly all muscles are situated on, or very close to, the body, and limb movements are effected by means of long tendons passing through slings and "pulley" arrangements at the main joints. Even the head, the most massive extremity, has been perfectly tailored to reduce weight; the bill is finely honeycombed with air spaces and teeth were eliminated very early in the evolution of birds.

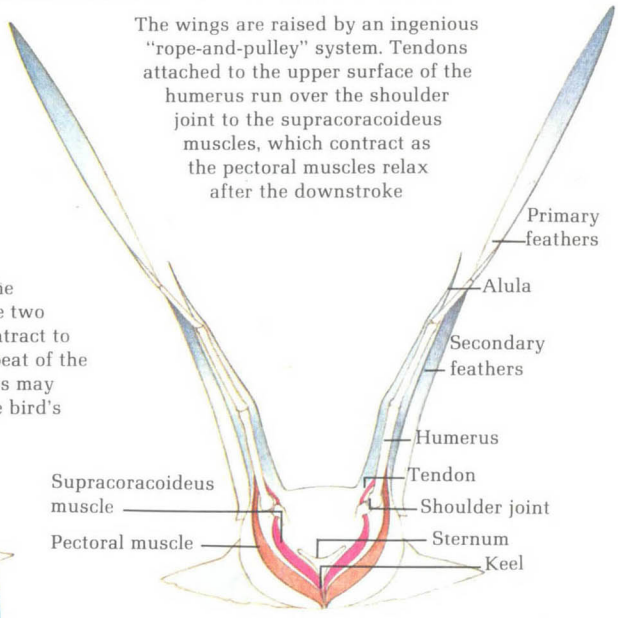
Feathers confer on birds an important advantage lacking in the other flying animals: their hind legs remain entirely free. By contrast, bats (and the extinct pterosaurs) have their hind-limbs integrated into their membranous wings – rendering them almost helpless on the ground. Nevertheless, even converting the fore-limbs alone into wings has drawbacks: these limbs are useless for manipulating food or other material. To compensate, birds have long flexible necks and extremely mobile and versatile jaw mechanisms quite capable of the most delicate manipulations. Lacking teeth, birds need some other means of grinding their food, particularly so in those species feeding on hard seeds. The grinding function is performed by the muscular gizzard, a specialized part of the stomach, and in many species the action is aided by grit swallowed by the bird.

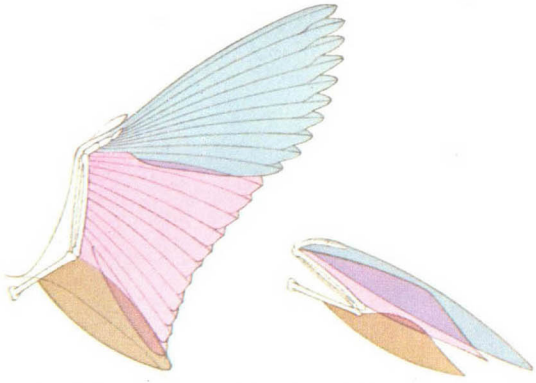
Senses of sight and hearing are acute, but few birds appear to have any highly developed sense of smell. The eyes are huge, almost meeting at the centre of the skull, and are capable of resolving very fine detail over most of the field of view. Sensitivity to movement is also well developed – a vital factor in the bird's ability to navigate. Similarly, the bird's ears can detect very rapid changes in sound. Spectrographic analysis of bird songs reveals that many of the song patterns are far too rapid for the human ear to detect – yet these are full of significance to the birds themselves.

The wings are raised by an ingenious "rope-and-pulley" system. Tendons attached to the upper surface of the humerus run over the shoulder joint to the supracoracoideus muscles, which contract as the pectoral muscles relax after the downstroke

Anchored to the projecting keel of the sternum, and to the inner end of the humerus, the two massive pectoral muscles contract to provide power for the downbeat of the wing. These powerful muscles may account for 25 per cent of the bird's body weight in some species

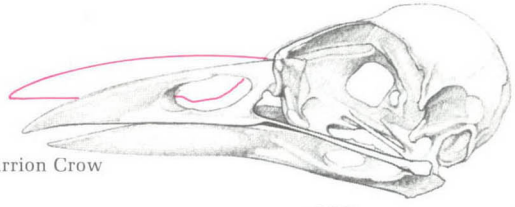






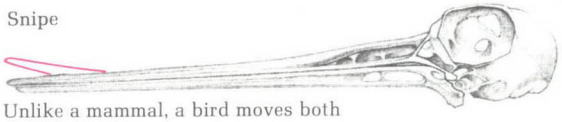
The wing skeleton consists of humerus (upper arm), radius and ulna (forearm) and fused hand and wrist bones, which support the primary feathers

At rest, the wing folds neatly, inner feathers overlying outer. Secondary feathers, supported by radius and ulna, overlie the primaries, partly covering them

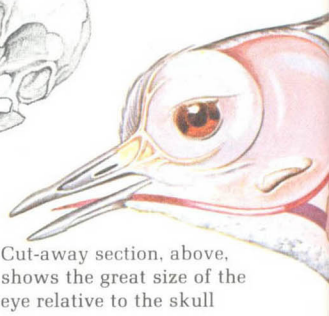


Carrion Crow

Snipe

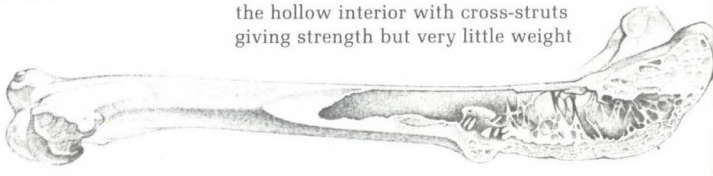


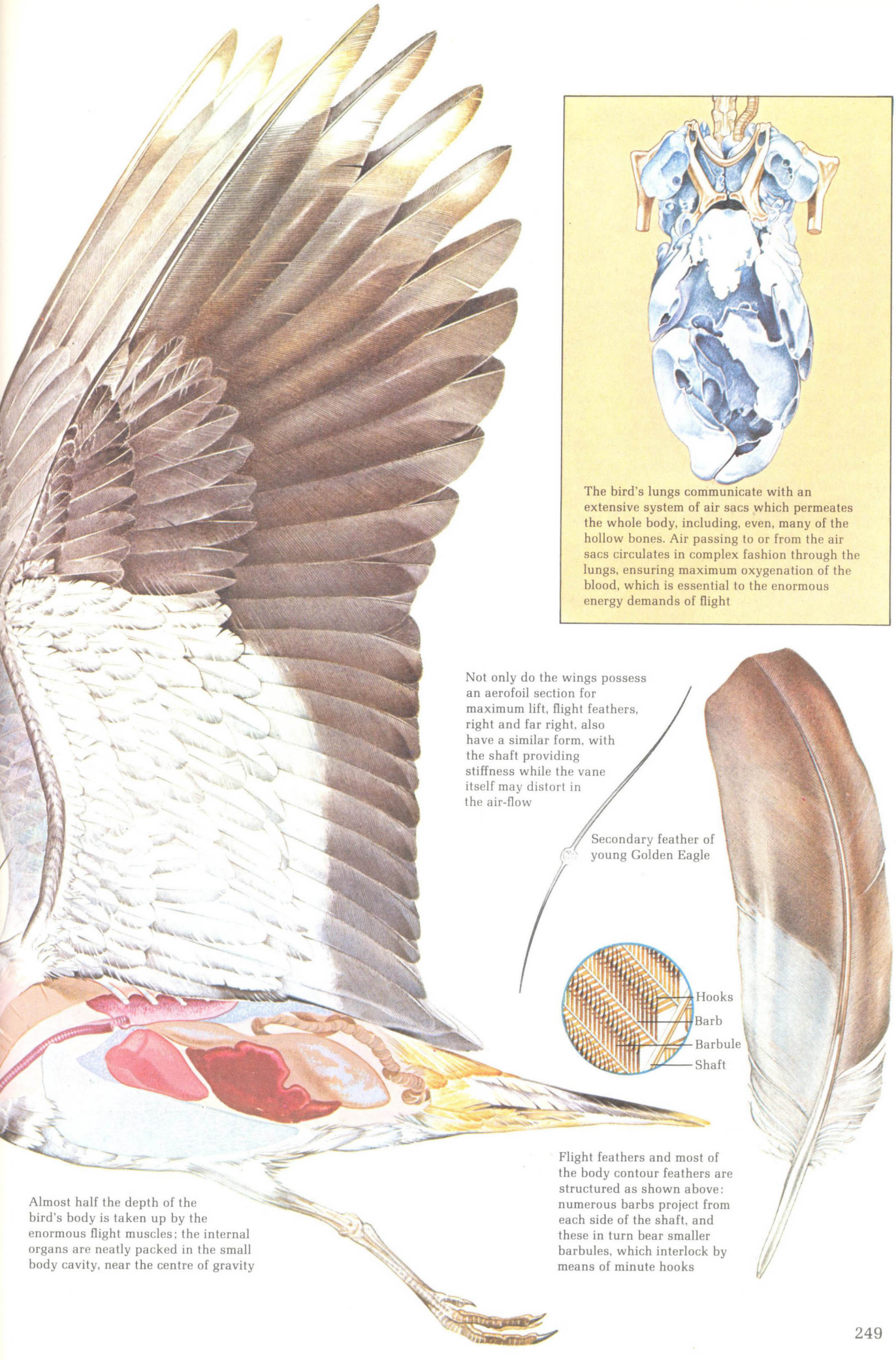
Unlike a mammal, a bird moves both upper and lower jaws. The action is produced by muscles behind the eyes which transmit their force through bony levers. The Crow's skull is typical; that of the Snipe is modified so that bending occurs near the tip of the bill



Cut-away section, above, shows the great size of the eye relative to the skull

Sectioned humerus of the Raven shows the hollow interior with cross-struts giving strength but very little weight





The bird's lungs communicate with an extensive system of air sacs which permeates the whole body, including, even, many of the hollow bones. Air passing to or from the air sacs circulates in complex fashion through the lungs, ensuring maximum oxygenation of the blood, which is essential to the enormous energy demands of flight

Not only do the wings possess an aerofoil section for maximum lift, flight feathers, right and far right, also have a similar form, with the shaft providing stiffness while the vane itself may distort in the air-flow

Secondary feather of young Golden Eagle

Hooks
Barb
Barbule
Shaft

Flight feathers and most of the body contour feathers are structured as shown above: numerous barbs project from each side of the shaft, and these in turn bear smaller barbules, which interlock by means of minute hooks

Almost half the depth of the bird's body is taken up by the enormous flight muscles; the internal organs are neatly packed in the small body cavity, near the centre of gravity

Techniques of Flight

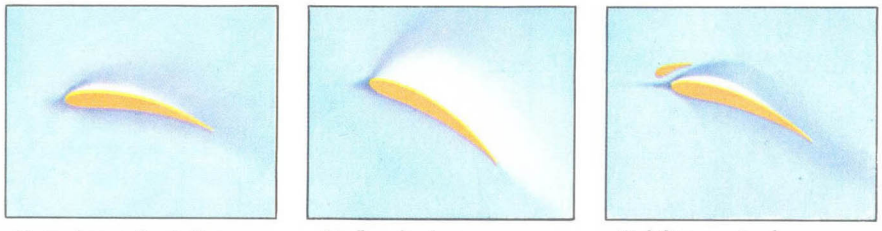
Every bird observed on the wing will be seen to show a preference for one of four main techniques of flight–gliding, soaring, flapping or hovering–though many species will utilize combinations of these basic techniques according to their physical environment and feeding method.

Gliding–the simplest technique–requires minimal expenditure of energy; the bird is kept aloft simply by the pressure difference above and below the wing caused by the air-flow over the aerofoil. However, friction inevitably reduces the bird's air speed and without further action it would simply stall. Speed is maintained by using the pull of gravity; the bird glides in a descending path, rising at intervals either by changing to flapping flight or by utilizing a rising current of air.

Soaring birds rely entirely on upward-moving air currents, usually the thermal updraughts caused by differential heating of land surfaces. By subtle movements of the body and wings the bird exploits the currents to fly horizontally or to climb and may remain on the wing for hours without any great expenditure of its energy resources. Birds commonly soar in rising spirals – remaining within the roughly cylindrical column of the thermal, but breaking away at the top to glide down to a lower point on the next thermal.

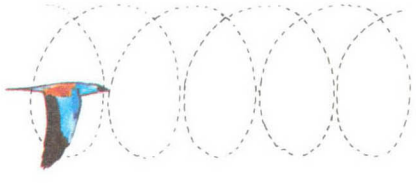
Flapping flight requires a very high output of energy, quite beyond many large soaring birds such as the storks and eagles, and the former–because they have no opportunity to feed *en route*–must conserve energy and ride the air currents throughout their annual migrations. Flapping flight has two variations; one used for take-off and rapid climbing, the other for normal horizontal flight. In simple forward flight, the bird uses its wing like an oar–powerful downstrokes generating sufficient thrust and lift to keep the bird airborne. The upstroke in this form of flight is passive. Take-off and rapid climbing require greater lift and upward force is generated on both upstroke and downstroke.

Hovering is a highly specialized form of flight, finding its highest development in the humming-birds. Among European birds the Kestrel is the most adept, though others, such as terns, hover briefly before diving for food. Most hovering birds fly into the wind so that their air speed and the wind speed cancel out, allowing the bird to remain in one spot: humming-birds, however, can hover in still air and even fly backwards or sideways for a limited length of time.



Normal smooth air-flow | Air-flow broken | Stability regained

In order to function efficiently, the wings must have the aerofoil section illustrated above. The pressure difference created by the air-flow over and beneath the wing provides the lifting force necessary to keep the bird airborne. To fly slowly, the bird must increase the "angle of attack", that is, incline the wing more steeply into the air-flow, but too great an angle of attack will allow the air-stream to break free from the aerofoil surface as turbulence: the pressure difference is lost and the bird stalls. At slow speed, the alula (the tiny "bastard wing" on the leading edge of the main wing) is extended to form a slot which smooths the air-flow over the wing surface and maintains the bird's stability.

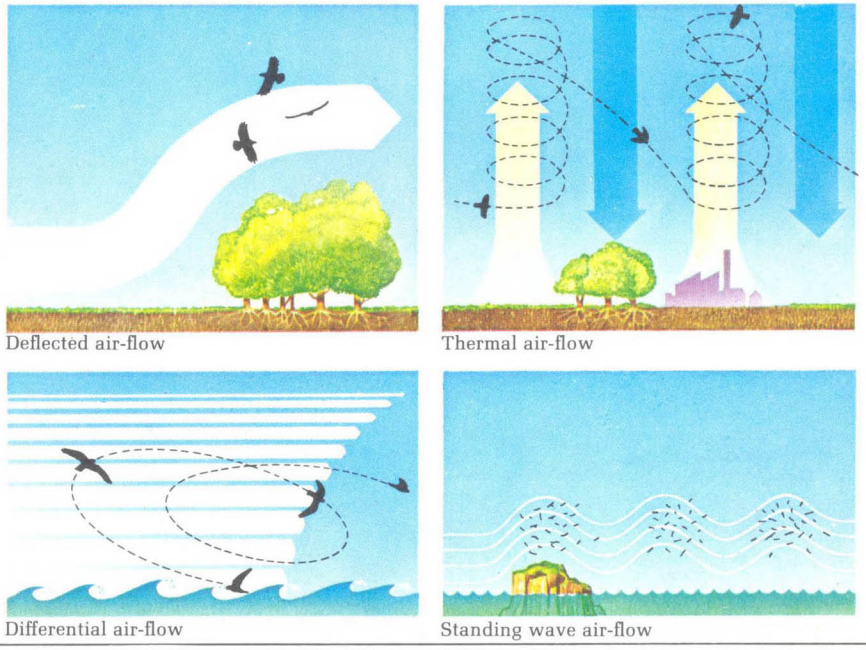


In forward flight, the bird's wing describes a roughly circular path relative to the body, sweeping forward and down on the power-stroke; back and up on the return. However, viewed in forward flight this action is seen as a rowing motion–difficult to discern in many tiny, fast-flying species but quite clear in slower-moving birds like Rooks and geese

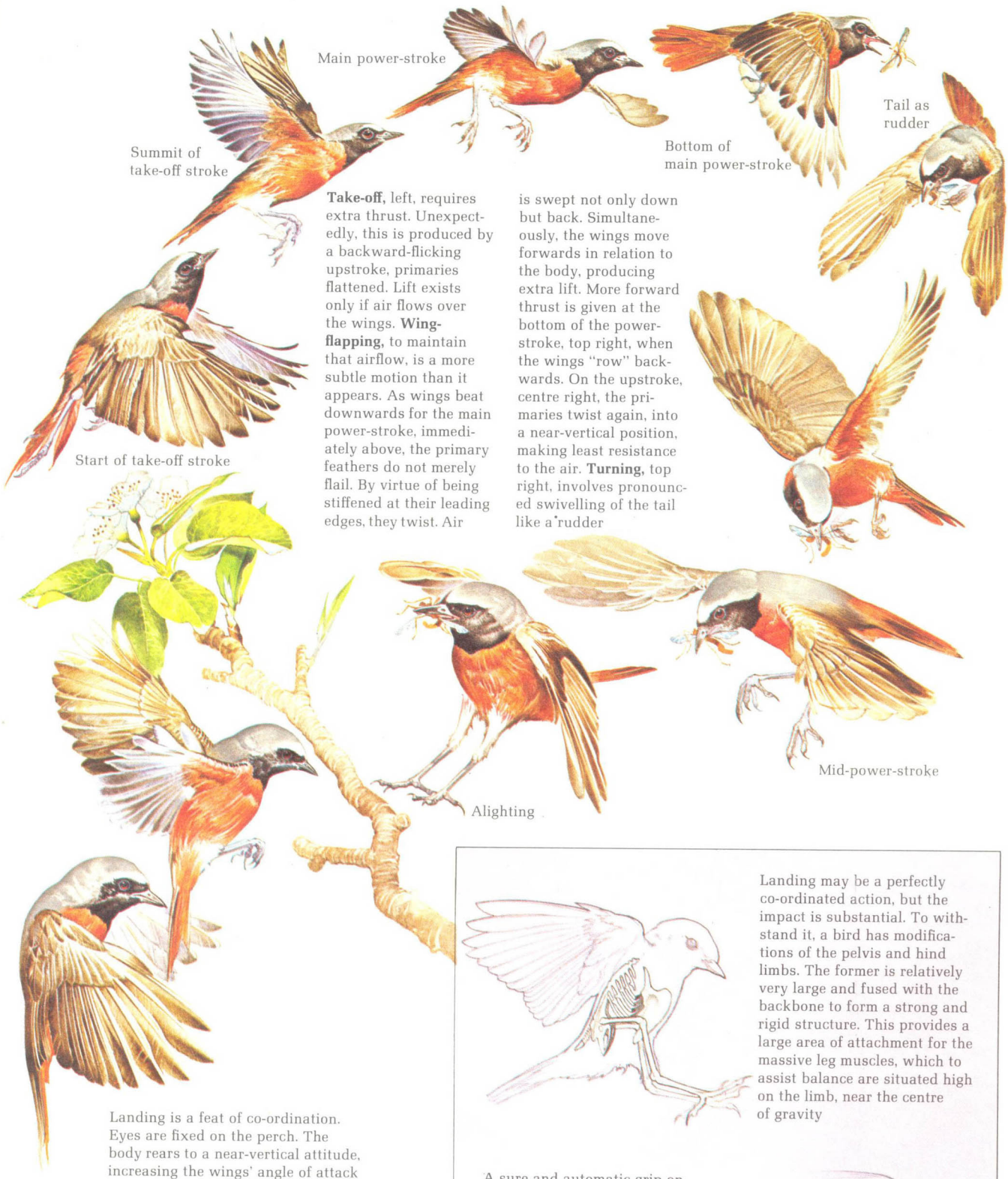
The techniques of flight

Many soaring birds make use of the upward currents of air caused by physical obstacles such as woods, buildings and cliff faces. Thermals are more localized updraughts of warm air which form over land wherever the surface is subject to differential heating. Rising air commonly occurs over ploughed land and over towns; cool air descends over "cold" (heat absorbing) areas, notably over woodland and areas of water. Migrant birds make full use of thermals during their annual journeys and such species generally avoid long sea crossings.

Gliding and soaring flight saves vital energy for seabirds which habitually roam over vast areas of ocean. Flying over waves, the bird gains speed in the faster-moving air 50 to 100 feet above the surface, then glides down through progressively slower-moving air, eventually turning into the wind to soar upwards again. Soaring Gannets, far right, accumulate in groups in the standing waves which form down-wind of a physical obstruction



Deflected air-flow | Thermal air-flow | Differential air-flow | Standing wave air-flow

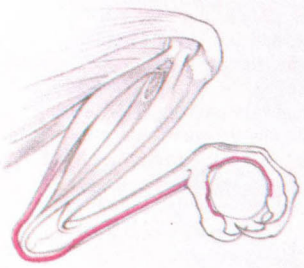


Take-off, left, requires extra thrust. Unexpectedly, this is produced by a backward-flicking upstroke, primaries flattened. Lift exists only if air flows over the wings. **Wing-flapping,** to maintain that airflow, is a more subtle motion than it appears. As wings beat downwards for the main power-stroke, immediately above, the primary feathers do not merely flail. By virtue of being stiffened at their leading edges, they twist. Air is swept not only down but back. Simultaneously, the wings move forwards in relation to the body, producing extra lift. More forward thrust is given at the bottom of the power-stroke, top right, when the wings "row" backwards. On the upstroke, centre right, the primaries twist again, into a near-vertical position, making least resistance to the air. **Turning,** top right, involves pronounced swivelling of the tail like a rudder

Landing is a feat of co-ordination. Eyes are fixed on the perch. The body rears to a near-vertical attitude, increasing the wings' angle of attack to the point where a stall is induced. Descent to a perch requires a massive reduction in lift, achieved in part by raising the tail for maximum air spillage. Whatever the approach, speed is checked by spreading wings and tail to act as brakes, and by beating the wings against the direction of movement. Finally, the legs reach for the perch. Any tendency to stall before the last moment is checked by spreading the alula

Landing may be a perfectly co-ordinated action, but the impact is substantial. To withstand it, a bird has modifications of the pelvis and hind limbs. The former is relatively very large and fused with the backbone to form a strong and rigid structure. This provides a large area of attachment for the massive leg muscles, which to assist balance are situated high on the limb, near the centre of gravity

A sure and automatic grip on its perch is vital if a bird is to sit there for hours on end, if necessary asleep. The toes are flexed by a tendon that passes round the intertarsal or "ankle" joint. The weight of the bird on its legs makes the intertarsal bend; if it bends, the tendon stretches, if the tendon stretches, the toes have no option but to grip



The Unspoken Language

The patterns of behaviour adopted by birds are just as closely tailored to their varying life styles as are their physical adaptations and their plumage colours. Thus, for example, birds which feed on items found only by diligent searching—such as tiny insects among vegetation—usually forage most efficiently alone. Such species usually also nest alone and maintain a sizeable territory around the nest site in which to search for food. Most passerines fall into this category and such familiar aspects of behaviour as the songs and display flights of the male birds all function to maintain this territorial claim against competing neighbours and to advertise the male's presence to potential mates in the area.

Birds using abundant and easily exploited food supplies, such as seeds and flying insects, often feed in flocks and many also nest colonially. Among colonial nesters, territory is reduced to a tiny area around the nest, and the main features of behaviour are the elaborate patterns of social signals necessary to prevent friction within the colony.

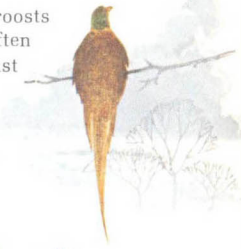
The study of behaviour—ethology—has shown that many activities involve a stereotyped performance known as a "fixed action pattern", triggered by a specific stimulus.

Basic maintenance activities, a vital element in any bird's behavioural repertoire, are generally seen when the bird is at rest but not sleeping. Care of the plumage, by preening and by bathing, is particularly important as, in addition to flight, the feathers provide the bird's only insulation. Most birds have an oil gland situated at the base of the tail, and during preening its secretion is spread on to the feathers to maintain their suppleness and resistance to wear, and to waterproof the plumage. Preening is often accompanied by ruffling actions, which re-align the feathers, and by "comfort" movements such as leg and wing stretching

Blackbird sunbathing: wings outspread, tail fanned, feathers well separated

Blackbird bathing: feathers are cleaned and cleared of parasites by water bathing or dusting

Pheasant, right, roosts alone in a tree, often silhouetted against the evening sky

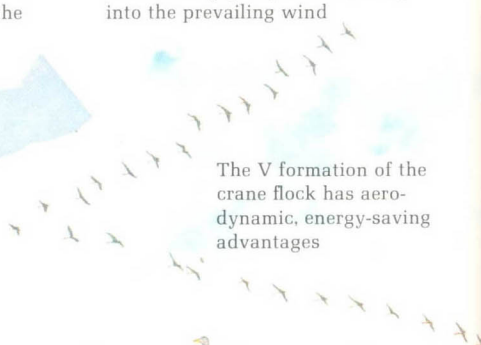


Birds spend a great deal of time preening their feathers, oiling them and drawing each in turn through the bill to repair "breaks" in the mesh of barbules

Dunlin, above, roost communally, often closely grouped and facing into the prevailing wind

Social organization in gregarious species is maintained by a complex and often subtle "language" of actions and postures. Stability and cohesion within a flock is assured by a strict hierarchy, or "pecking order", in which every bird knows its place. The order results from numerous encounters between individuals, but the clashes seldom involve fighting; the exchange is invariably by signal—threat by one bird, submission by the other. Members of a pair signify recognition and acceptance by greeting ceremonies which block any spontaneous aggressive responses

Red spot stimulates young Herring Gull to beg even from a crude bill model



The V formation of the crane flock has aerodynamic, energy-saving advantages

The bright red interior of the Kittiwake's mouth features in greeting displays

Communal feeding increases flock security—a sentinel bird is always alert to any approaching danger

Among birds with identical male and female plumage colouring, the sexes are differentiated by their behaviour patterns. Such species show particularly clearly how signals and responses can function as a visual language. In the Herring Gull, for example, the intrusion of any individual into a male's territory will immediately provoke a threat posture from the resident. If the intruder is a male he will respond aggressively and a brief fight may ensue—invariably ending in victory for the holder of the territory, and the withdrawal of the intruding bird

The upright posture of the gull at left indicates hostility towards an intruder

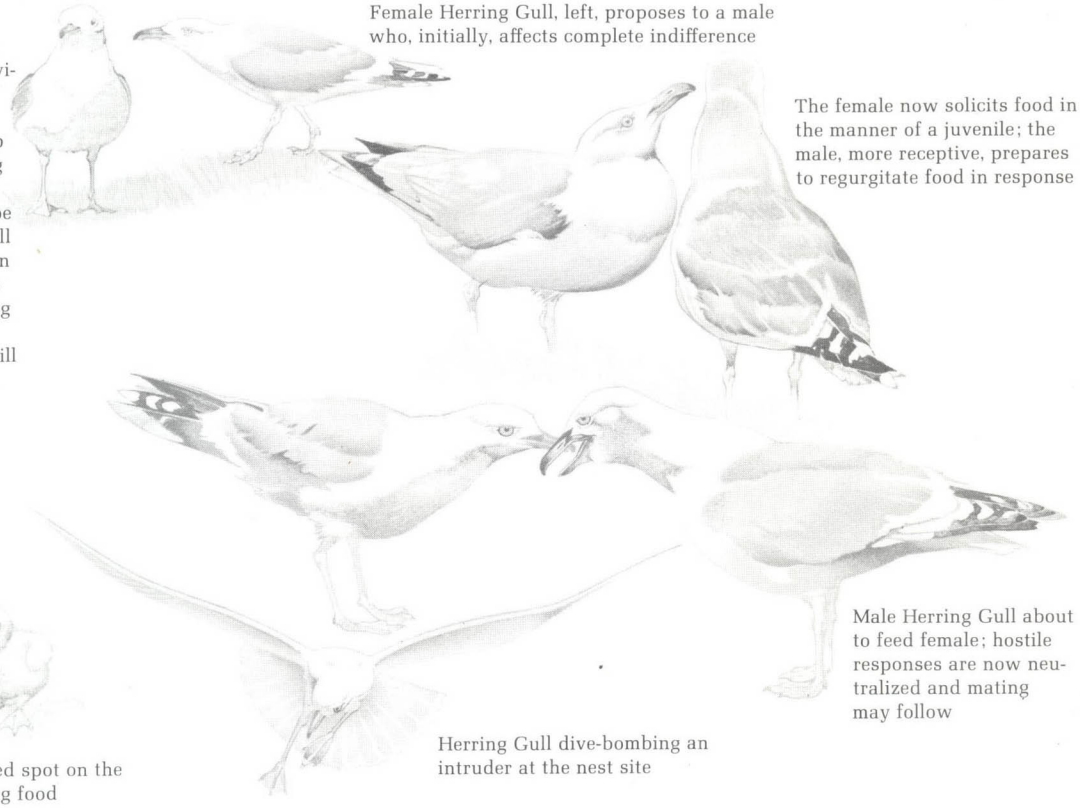
The intruder, in this case a male, reacted to the "resident's" threat with aggression; his bluff called, he retreats

The majority of birds form monogamous relationships in which both parents share in the feeding and protection of the young. This behavioural trait is particularly important in species whose young are nidicolous—those born blind, unfeathered and unable to fend for themselves. Polygamous and promiscuous relationships, in which the female alone must tend the eggs and young, are less common.

Although monogamous birds do perform courtship displays, some of which are quite striking, the most bizarre and elaborate rituals occur in the promiscuous species. Extreme forms of display carry an increased risk from predators as the performing bird is very conspicuous and also preoccupied with its activity. The dangers may be minimized if the display is performed communally at a "lek", as in the case of the Ruff and Black Grouse, so that at least one bird is almost certain to see any approaching threat and give the alarm.

A phenomenon common to many patterns of behaviour is the incorporation of activities more appropriate to some quite different function: thus, courtship may include begging and ritual feeding, as in the Herring Gull, or the offering of nest material—an important part of the Great Crested Grebe's display.

Postures and movements taken from everyday activities may be stylized and used to convey specific meanings in the courtship ritual. The female Herring Gull, on approaching a male, will automatically be met with hostility, but will block any open aggression by adopting a submissive attitude. She may then beg for food, like a juvenile bird, whereon the male will feed her by regurgitation



Female Herring Gull, left, proposes to a male who, initially, affects complete indifference

The female now solicits food in the manner of a juvenile; the male, more receptive, prepares to regurgitate food in response

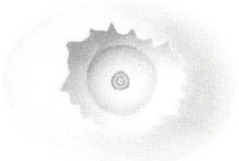
Male Herring Gull about to feed female; hostile responses are now neutralized and mating may follow

A nestling pecks at the red spot on the adult's bill when soliciting food

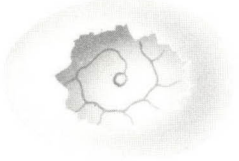
Herring Gull dive-bombing an intruder at the nest site

Development within the egg

The number of eggs comprising the clutch, and the size, shape, colour and weight of the eggs, varies enormously from one species to another as does the period of time taken for the development and subsequent incubation of the egg. However, the processes taking place within the egg are essentially the same in all birds and are here illustrated by the domesticated hen, which, like other game-birds, wildfowl, waders, cranes, grebes and divers, is a nidifugous species. Most other species have nidicolous young. Gulls and terns produce well-developed young, but these remain on, or near, the nest for some time after birth



Day 1: the spherical yolk floats in the fluid albumin (white) with the blastodisc, an early stage of the embryo, uppermost

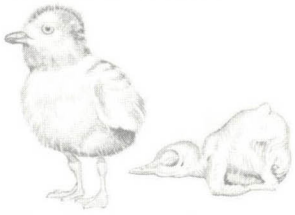


Day 3: the tiny embryonic heart, with the main blood vessels already formed, is beating before the chick is recognizable

Day 9: now clearly visible, the chick is receiving oxygen through pores in the shell, and nutrients from the yolk via the network of blood vessels

Day 15: eyes, bill and feet are prominent features of the chick as it develops rapidly at the expense of the life-giving nutrient yolk mass

Day 21: now fully developed, the chick breaks out of the shell with the aid of the sharp "egg-tooth" on the tip of the diminutive bill



Nidifugous young are down-covered and mobile; nidicolous young are born blind and helpless

Bird-watching in Europe

Many of the wild areas of Europe are fast disappearing—whittled away by the relentless encroachment of twentieth-century civilization. Natural forest is cut down to be replaced by less interesting plantations of commercial softwoods, while wetlands, with their characteristic and fascinating birdlife, are drained to create land for development.

To ensure the survival of at least some of the more important wilderness areas, conservation organizations have been set up in most European countries, many of which own or manage nature reserves. Some are run by the State, like the Nature Conservancy in Britain, while others are voluntary, depending for their funds on the subscriptions of their members. The Royal Society for the Protection of Birds (RSPB) is a British organization concerned primarily with areas of ornithological value; similar organizations exist in most of the countries of Europe and their addresses are given in the list below.

Large and important reserves often have a resident staff of trained guides and wardens, and a clearly marked network of footpaths—often with hides positioned at particularly favourable observation points. Tours of the area, led by an expert guide, are commonly available and many of the major reserves run training courses in bird-ringing. Smaller reserves may only have a part-time warden—if any—and in these areas above all the bird-watcher should remember his responsibilities: these remaining wild areas are precious not only to the wildlife they support but to future generations of Europeans.

CONSERVATION IN EUROPE

AUSTRIA
Östereichische Gesellschaft für Vogel Kunde,
Naturhistorisches Museum,
A-1014 Vienna 1.

BELGIUM
Institut Royal des Sciences Naturelles de Belgique,
Rue Vautier 31,
Bruxelles 4.

DENMARK
Dansk Ornithologisk Forening,
Faelledvej 9 Mezz,
Dk 2200, Copenhagen N.

EIRE
Irish Society for the Protection of Birds,
Dept. of Lands,
24 Upper Merrien Street,
Dublin 2.

FINLAND
Societas pro Fauna et Flora Fennica,
Zoological Museum of the University,
Novra Järnvagsgaten 13,
Helsinki 10.

FRANCE
Ligue pour la Protection des Oiseaux,
57 Rue Cuvier,
BP505,
75005 Paris.

GERMANY (Federal Republic)
Deutscher Bund für Vogelschutz,
705 Waiblingen,
Lange Strasse 34.

GREAT BRITAIN
British Trust for Ornithology,
Beech Grove,
Tring,
Herts. HP23 5NR.

Royal Society for the Protection of Birds,
The Lodge,
Sandy,
Beds. SG19 2DL.

Scottish Ornithologists Club,
21 Regent Terrace,
Edinburgh, EH7 5BT.

ITALY
La Lega Italiana per la Protezione degli Uccelli,
Lungano Guicciardina 9,
50125 Firenze.

LUXEMBOURG
Ligue Luxembourgeoise pour L'Etude et la Protection des Oiseaux,
32 Rue de la Forêt, Luxembourg.

THE NETHERLANDS
Nederlandse Vereniging Tot Berscherming Van Vogels,
Driebergseweg 16B,
Zeist 2740.

NORWAY
Zoologisk Museum,
Sarsgatan 1,
Oslo 5.

PORTUGAL
Sociedada Portuguesa de Ornitologia,
Seccão de Zoologica,
Faeuldade Ciencas,
Oporto.

SPAIN
Sociedad Española de Ornitologica,
Castellana 80,
Madrid.

SWEDEN
Svenska Naturskyddsföreningen,
Kungsholms Strand 125,
112 34 Stockholm.

Sveriges Ornitologiska Förening,
Runebergsgatan 8,
114 29 Stockholm.

SWITZERLAND
Schweizerische Vogelwarte,
6204 Sempach, Lucerne.

AREAS OF SPECIAL INTEREST

Denmark
1 Skagen
2 Rold Skov
3 North Sjaelland
4 Copenhagen
5 West Sjaelland
6 Lolland-Falster-Mo
7 Langeland
8 South Jutland
9 Blaavandshuk
10 Ringkøbing Fjord
11 Limfjorden

Great Britain
1 Shetland–Fair Isle
2 Speyside
3 Foulsheugh
4 Firth of Forth
5 Farne Islands
6 The Wash
7 Minsmere
8 Thames–Medway
9 London Reservoirs
10 Portland–Weymouth
11 Slimbridge
12 Skokholm–Skomer
13 Dee Estuary
14 The Hebrides

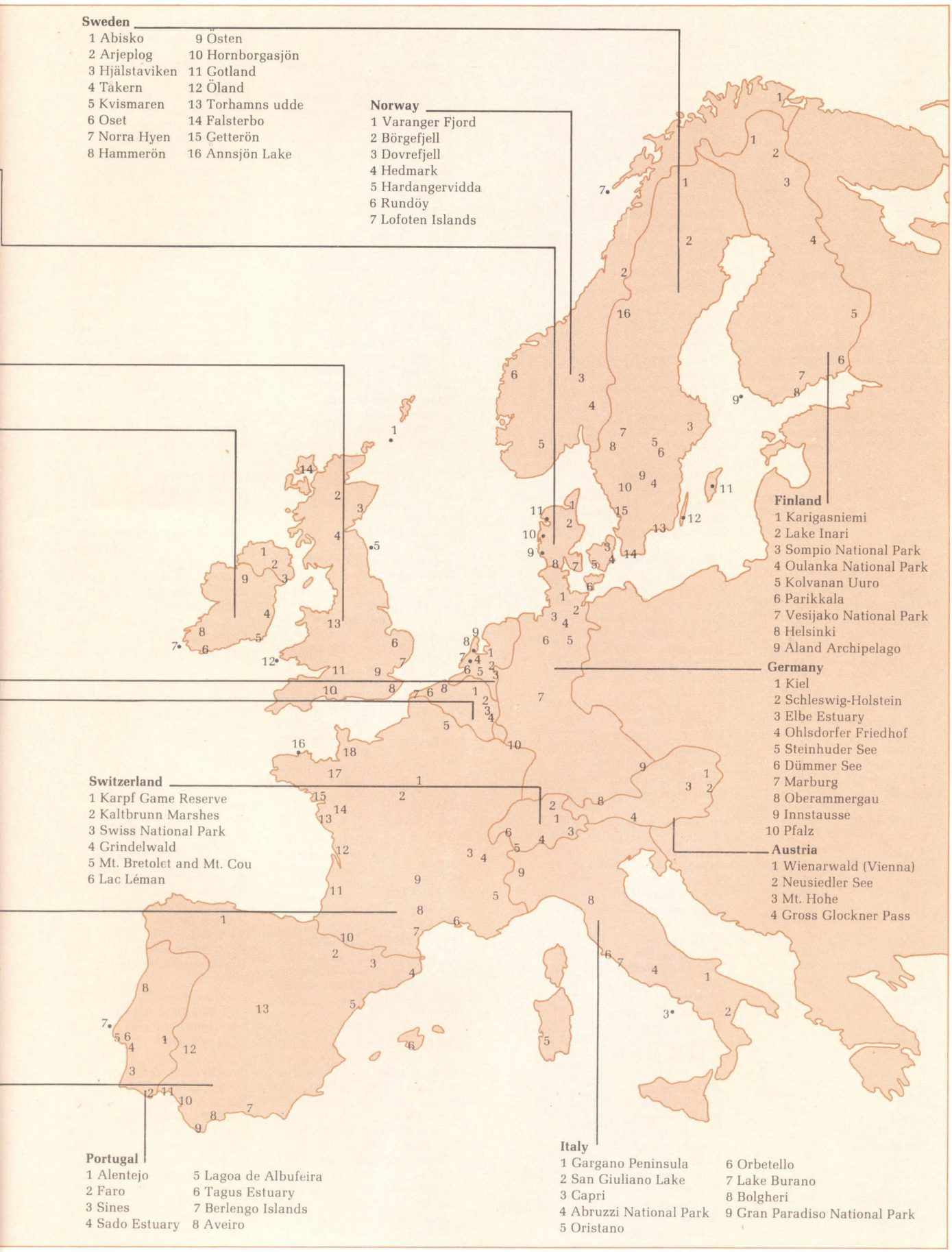
Ireland
1 Malin Head
2 Lough Neagh
3 Strangford Lough
4 Dublin–North Bull Island
5 Wexford Slobs
6 Cape Clear Island
7 Kerry Islands
8 Lough Akeagh
9 Lough Erne

The Netherlands
1 Zwartemeer
2 Oostelijk Flevoland
3 De Hoge Veluwe
4 Naarder Meer
5 Lake Nieuwkoop
6 Rhine Delta
7 Alkmaarder Meer
8 Zwanenwater
9 Texel

Belgium
1 Kalmthout Heath
2 Campine
3 Genk
4 Hautes- Fagnes National Park
5 Harchies
6 Blankaart
7 Yser Estuary
8 Zwin

France
1 Sologne
2 Brenne
3 Dombes
4 Lac du Bourget
5 Vanoise National Park
6 Camargue
7 Languedoc
8 Gorges du Tarn
9 St. Flour
10 Port du Gavarnie
11 Les Landes
12 Ile d'Olonne
13 Baie de Bourgneuf
14 Lac de Grand Lieu
15 Golfe du Morbihan
16 Sept-Iles
17 St. Malo
18 Baie de Veys

Spain
1 Montana de Covadonga
2 Pyrénées
3 Andorra
4 La Escala
5 Ebro Delta
6 Majorca
7 Sierra Nevada
8 Ronda
9 Southern Andaluc
10 Coto de Dña Ana
11 Huelva
12 Badajoz
13 Sierra Guadarram


Sweden
1 Abisko
2 Arjeplog
3 Hjälstaviken
4 Täkern
5 Kvismaren
6 Oset
7 Norra Hyen
8 Hammerön
9 Östen
10 Hornborgasjön
11 Gotland
12 Öland
13 Torhamns udde
14 Falsterbo
15 Getterön
16 Annsjön Lake
Norway
1 Varanger Fjord
2 Börgefjell
3 Dovrefjell
4 Hedmark
5 Hardangervidda
6 Rundöy
7 Lofoten Islands
Finland
1 Karigasniemi
2 Lake Inari
3 Sompio National Park
4 Oulanka National Park
5 Kolvanan Uuro
6 Parikkala
7 Vesijako National Park
8 Helsinki
9 Aland Archipelago
Germany
1 Kiel
2 Schleswig-Holstein
3 Elbe Estuary
4 Ohlsdorfer Friedhof
5 Steinhuder See
6 Dümmer See
7 Marburg
8 Oberammergau
9 Innstausse
10 Pfalz
Austria
1 Wienarwald (Vienna)
2 Neusiedler See
3 Mt. Hohe
4 Gross Glockner Pass
Switzerland
1 Karpf Game Reserve
2 Kaltbrunn Marshes
3 Swiss National Park
4 Grindelwald
5 Mt. Bretolet and Mt. Cou
6 Lac Léman
Portugal
1 Alentejo
2 Faro
3 Sines
4 Sado Estuary
5 Lagoa de Albufeira
6 Tagus Estuary
7 Berlengo Islands
8 Aveiro
Italy
1 Gargano Peninsula
2 San Giuliano Lake
3 Capri
4 Abruzzi National Park
5 Oristano
6 Orbetello
7 Lake Burano
8 Bolgheri
9 Gran Paradiso National Park

Checklist of Scientific Names and Common Names

Avocet	*Recurvirostra avosetta*
Bee-eater	*Merops apiaster*
Bittern	*Botaurus stellaris*
Little	*Ixobrychus minutus*
Blackbird	*Turdus merula*
Blackcap	*Sylvia atricapilla*
Bluethroat, Red-spotted	*Luscinia s. svecica*
White-spotted	*Luscinia s. cyanecula*
Brambling	*Fringilla montifringilla*
Bullfinch	*Pyrrhula pyrrhula*
Bunting, Cirl	*Emberiza cirlus*
Corn	*Emberiza calandra*
Ortolan	*Emberiza hortulana*
Reed	*Emberiza schoeniclus*
Rock	*Emberiza cia*
Snow	*Plectrophenax nivalis*
Buzzard	*Buteo buteo*
Honey	*Pernis apivorus*
Rough-legged	*Buteo lagopus*
Capercaillie	*Tetrao urogallus*
Chaffinch	*Fringilla coelebs*
Chiffchaff, southern race	*Phylloscopus c. collybita*
Chiffchaff, northern race	*Phylloscopus c. abietinus*
Chough	*Pyrrhocorax pyrrhocorax*
Alpine	*Pyrrhocorax graculus*
Coot	*Fulica atra*
Cormorant	*Phalacrocorax carbo*
Cormorant, southern race	*Phalacrocorax c. sinensis*
Corncrake	*Crex crex*
Crane	*Grus grus*
Crossbill	*Loxia curvirostra*
Crow, Carrion	*Corvus c. corone*
Hooded	*Corvus c. cornix*
Cuckoo	*Cuculus canorus*
Curlew	*Numenius arquata*
Dabchick	*Tachybaptus ruficollis*
Dipper, Black-bellied	*Cinclus c. cinclus*
Dipper, British race	*Cinclus c. gularis*
Diver, Black-throated	*Gavia arctica*
Great Northern	*Gavia immer*
Red-throated	*Gavia stellata*
Dotterel	*Eudromias morinellus*
Dove, Collared	*Streptopelia decaocto*
Rock	*Columba livia*
Stock	*Columba oenas*
Turtle	*Streptopelia turtur*
Duck, Ferruginous	*Aythya nyroca*
Long-tailed	*Clangula hyemalis*
Tufted	*Aythya fuligula*
Dunlin, northern race	*Calidris a. alpina*
Dunlin, southern race	*Calidris a. schinzii*
Dunnock	*Prunella modularis*
Eagle, Booted	*Hieraletus pennatus*
Golden	*Aquila chrysaetos*
Short-toed	*Circaetus gallicus*
Imperial	*Aquila heliaca adalberti*
Egret, Cattle	*Bubulcus ibis*
Little	*Egretta garzetta*
Eider	*Somateria mollissima*
Falcon, Eleonora's	*Falco eleonorae*
Fieldfare	*Turdus pilaris*
Finch, Snow	*Montifringilla nivalis*
Firecrest	*Regulus ignicapillus*
Flamingo	*Phoenicopterus ruber*
Flycatcher, Collared	*Ficedula albicollis*
Pied	*Ficedula hypoleuca*
Spotted	*Muscicapa striata*
Fulmar	*Fulmarus glacialis*
Gadwall	*Anas strepera*
Gannet	*Sula bassana*
Garganey	*Anas querquedula*
Godwit, Bar-tailed	*Limosa lapponica*
Black-tailed	*Limosa limosa*
Goldcrest	*Regulus regulus*
Goldeneye	*Bucephala clangula*
Goldfinch	*Carduelis carduelis*
Goosander	*Mergus merganser*
Goose, Barnacle	*Branta leucopsis*
Bean	*Anser f. fabalis*
Bean, eastern race	*Anser f. rossicus*
Brent, dark-bellied	*Branta b. bernicla*
Brent, pale-bellied	*Branta b. hrota*
Canada	*Branta canadensis*
Greylag	*Anser anser*
Pink-footed	*Anser fabalis brachyrhynchus*
White-fronted	*Anser albifrons*
White-fronted, Greenland race	*Anser a. flavirostris*
Goshawk	*Accipiter gentilis*
Grebe, Black-necked	*Podiceps nigricollis*
Great Crested	*Podiceps cristatus*
Little	*Tachybaptus ruficollis*
Red-necked	*Podiceps griseigena*
Slavonian	*Podiceps auritus*
Greenfinch	*Carduelis chloris*
Greenshank	*Tringa nebularia*
Grouse, Black	*Lyrurus tetrix*
Red	*Lagopus l. scoticus*
Willow	*Lagopus l. lagopus*
Guillemot	*Uria aalge*
Black	*Cepphus grylle*
Gull, Black-headed	*Larus ridibundus*
Common	*Larus canus*
Glaucous	*Larus hyperboreus*
Great Black-backed	*Larus marinus*
Herring	*Larus a. argentatus*
Herring, Scandinavian race	*Larus a. omissus*
Iceland	*Larus glaucoides*
Lesser Black-backed	*Larus f. graellsii*
Lesser Black-backed, Scandinavian race	*Larus f. fuscus*
Little	*Larus minutus*
Harrier, Hen	*Circus cyaneus*
Marsh	*Circus aeruginosus*
Montagu's	*Circus pygargus*
Hawfinch	*Coccothraustes coccothraustes*
Heron, Grey	*Ardea cinerea*
Night	*Nycticorax nycticorax*
Purple	*Ardea purpurea*
Squacco	*Ardeola ralloides*
Hobby	*Falco subbuteo*
Hoopoe	*Upupa epops*
Jackdaw	*Corvus monedula*
Jay	*Garrulus glandarius*
Kestrel	*Falco tinnunculus*
Kingfisher	*Alcedo atthis*
Kite, Black	*Milvus migrans*
Red	*Milvus milvus*
Kittiwake	*Rissa tridactyla*
Knot	*Calidris canutus*
Lammergeier	*Gypaetus barbatus*
Lapwing	*Vanellus vanellus*
Lark, Crested	*Galerida cristata*
Linnet	*Acanthis cannabina*
Magpie	*Pica pica*
Mallard	*Anas platyrhynchos*
Martin, Crag	*Hirundo rupestris*
House	*Delichon urbica*
Sand	*Riparia riparia*
Merganser, Red-breasted	*Mergus serrator*
Merlin	*Falco columbarius*
Moorhen	*Gallinula chloropus*
Nightingale	*Luscinia megarhynchos*
Nightjar	*Caprimulgus europaeus*
Nutcracker	*Nucifraga caryocatactes*
Nuthatch	*Sitta europaea*
Oriole, Golden	*Oriolus oriolus*
Ortolan	*Emberiza hortulana*
Osprey	*Pandion haliaetus*
Ouzel, Ring	*Turdus t. torquatus*
Ring, Alpine	*Turdus t. alpestris*
Owl, Barn	*Tyto a. guttata*
Barn, continental race	*Tyto a. alba*
Little	*Athene noctua*
Long-eared	*Asio otus*
Scops	*Otus scops*
Short-eared	*Asio flammeus*
Tawny	*Strix aluco*
Oystercatcher	*Haematopus ostralegus*

Partridge	*Perdix perdix*
Red-legged	*Alectoris rufa*
Peregrine	*Falco peregrinus*
Phalarope, Grey	*Phalaropus fulicarius*
Red-necked	*Phalaropus lobatus*
Pheasant	*Phasianus colchicus*
Pigeon, Feral	*Columba livia*
Wood	*Columba palumbus*
Pintail	*Anas acuta*
Pipit, Meadow	*Anthus pratensis*
Rock	*Anthus s. petrosus*
Rock, Scandinavian race	*Anthus s. littoralis*
Tawny	*Anthus campestris*
Tree	*Anthus trivialis*
Water	*Anthus s. spinoletta*
Plover, Golden	*Pluvialis a. apricaria*
Golden, northern race	*Pluvialis a. altifrons*
Grey	*Pluvialis squatarola*
Kentish	*Charadrius alexandrinus*
Little Ringed	*Charadrius dubius*
Ringed	*Charadrius hiaticula*
Pochard	*Aythya ferina*
Red-crested	*Netta rufina*
Pratincole, Red-winged	*Glareola p. pratincola*
Ptarmigan	*Lagopus mutus*
Puffin	*Fratercula arctica*
Quail	*Coturnix coturnix*
Rail, Water	*Rallus aquaticus*
Raven	*Corvus corax*
Razorbill	*Alca torda*
Redpoll, Arctic	*Acanthis f. hornemanni*
Redpoll, Mealy	*Acanthus f. flammea*
British/central European race	*Acanthus f. cabaret*
Redshank	*Tringa totanus*
Redstart	*Phoenicurus phoenicurus*
Black	*Phoenicurus ochruros*
Redwing	*Turdus iliacus*
Robin	*Erithacus rubecula*
Roller	*Coracias garrulus*
Rook	*Corvus frugilegus*
Ruff	*Philomachus pugnax*
Sanderling	*Calidris alba*
Sandpiper, Common	*Tringa hypoleucos*
Curlew	*Calidris ferruginea*
Green	*Tringa ochropus*
Purple	*Calidris maritima*
Wood	*Tringa glareola*
Scaup	*Aythya marila*
Scoter	*Melanitta nigra*
Velvet	*Melanitta fusca*
Serin	*Serinus serinus*
Shag	*Phalacrocorax aristotelis*
Shearwater, Manx	*Puffinus puffinus*
Shelduck	*Tadorna tadorna*
Shoveler	*Anas clypeata*
Shrike, Great Grey	*Lanius excubitor*
Lesser Grey	*Lanius minor*
Red-backed	*Lanius collurio*
Woodchat	*Lanius senator*
Siskin	*Carduelis spinus*
Skua, Arctic	*Stercorarius parasiticus*
Great	*Stercorarius skua*
Long-tailed	*Stercorarius longicaudus*
Pomarine	*Stercorarius pomarinus*
Skylark	*Alauda arvensis*
Smew	*Mergus albellus*
Snipe	*Gallinago gallinago*
Jack	*Lymnocryptes minimus*
Sparrow, Hedge	*Prunella modularis*
House	*Passer domesticus*
Tree	*Passer montanus*
Sparrowhawk	*Accipiter nisus*
Spoonbill	*Platalea leucorodia*
Starling	*Sturnus vulgaris*
Stilt, Black-winged	*Himantopus himantopus*
Stint, Little	*Calidris minuta*
Temminck's	*Calidris temminckii*
Stonechat	*Saxicola torquata*
Stork, White	*Ciconia ciconia*
Swallow	*Hirundo rustica*
Red-rumped	*Hirundo daurica*
Swan, Bewick's	*Cygnus bewickii*
Mute	*Cygnus olor*
Whooper	*Cygnus cygnus*
Swift	*Apus apus*
Alpine	*Apus melba*
Teal	*Anas crecca*
Tern, Arctic	*Sterna paradisaea*
Black	*Chlidonias niger*
Common	*Sterna hirundo*
Gull-billed	*Gelochelidon nilotica*
Little	*Sterna albifrons*
Sandwich	*Sterna sandvicensis*
Thrush, Blue Rock	*Monticola solitarius*
Mistle	*Turdus viscivorus*
Rock	*Monticola saxatilis*
Song	*Turdus philomelos*
Tit, Bearded	*Panurus biarmicus*
Blue	*Parus caeruleus*
Coal, British race	*Parus a. britannicus*
Coal, continental race	*Parus a. ater*
Coal, Irish race	*Parus a. hibernicus*
Crested	*Parus cristatus*
Great	*Parus major*
Long-tailed, British race	*Aegithalos c. rosaceous*
northern race	*Aegithelos c. caudatus*
Marsh	*Parus palustris*
Willow, British race	*Parus m. montanus*
Willow, northern race	*Parus m. borealis*
Treecreeper	*Certhia familiaris*
Turnstone	*Arenaria interpres*
Twite	*Acanthis flavirostris*
Vulture, Black	*Aegypius monachus*
Egyptian	*Neophron percnopterus*
Griffon	*Gyps fulvus*
Wagtail, Blue-headed	*Motacilla f. flava*
Grey	*Motacilla cinerea*
Pied	*Motacilla alba yarrelli*
White	*Motacilla a. alba*
Yellow, British race	*Motacilla flava flavissina*
Yellow, Scandinavian race	*Motacilla f. thunbergi*
Yellow, Spanish race	*Motacilla f. Iberiae*
Warbler, Barred	*Sylvia nisoria*
Bonelli's	*Phylloscopus bonelli*
Cetti's	*Cettia cetti*
Dartford	*Sylvia undata*
Fan-tailed	*Cisticola juncidis*
Garden	*Sylvia borin*
Grasshopper	*Locustella naevia*
Great Reed	*Acrocephalus arundinaceus*
Icterine	*Hippolais icterina*
Marsh	*Acrocephalus palustris*
Melodious	*Hippolais polyglotta*
Reed	*Acrocephalus scirpaceus*
Sardinian	*Sylvia melanocephala*
Savi's	*Locustella luscinioides*
Sedge	*Acrocephalus schoenobaenus*
Subalpine	*Sylvia cantillans*
Willow, northern race	*Phylloscopus t. acredula*
Willow, southern race	*Phylloscopus t. trochilus*
Wood	*Phylloscopus sibilatrix*
Waxwing	*Bombycilla garrulus*
Wheatear	*Oenanthe o. oenanthe*
Wheatear, Greenland race	*Oenanthe o. leucorrhoa*
Black	*Oenanthe leucura*
Black-eared	*Oenanthe hispanica*
Whimbrel	*Numenius phaeopus*
Whinchat	*Saxicola rubetra*
Whitethroat	*Sylvia communis*
Lesser	*Sylvia curruca*
Wigeon	*Anas penelope*
Woodchat	*Lanius senator*
Woodcock	*Scolopax rusticola*
Woodlark	*Lullula arborea*
Woodpecker, Black	*Dryocopus martius*
Great Spotted	*Dendrocopos major*
Green	*Picus viridis*
Grey-headed	*Picus canus*
Lesser Spotted	*Dendrocopos minor*
Wren	*Troglodytes troglodytes*
Wryneck	*Jynx torquilla*
Yellowhammer	*Emberiza citrinella*

Glossary

Adult: difficult to define; size is misleading. Essentially a bird with definitive mature plumage.
Albinism: abnormal (white) colouring caused by absence of pigmentation.
Alula: the small "bastard" wing on the leading edge of the wing used to control stall tendency at very low speed.
Ankle: the intertarsal joint. May be mistakenly assumed to be the "knee" joint.
Axillaries: feathers in the "armpit" of the bird.

Brood: the young from a single clutch of eggs; hence **brooding**, the adult's action in sitting on the young to keep them warm.

Carpal joint: the small bones of the "wrist" joint–the forward-pointing joint of the folded wing.
Chevron: V-shaped marking.
Chick: colloquial term for a young bird between hatching and first flight.
Cock: general term for the male bird. More specific terms used for some species, eg cob (swan): drake (duck); gander (goose).
Commensal: sharing similar environment and food.
Contour feather: any feather forming part of the outer surface of the bird's plumage.
Coverts: the contour feathers that overlap the main wing or tail feathers.
Cryptic: colouring or patterning of the plumage which breaks up the outline of the bird and hence conceals or camouflages it.
Cursorial: adapted to running; a ground-dwelling species.

Diurnal: living and feeding mainly by day.
Decurved: bent downwards.

Eclipse: dull plumage assumed notably by male ducks for a period after the breeding season.
Exotic: term describing a species not normally found in the area under consideration.

False preening: a behavioural quirk, roughly similar in human terms to scratching the head.
Family: taxonomic term; a grouping of genera.

Feral: literally meaning wild. In ornithology, used to denote a once-domesticated species that has reverted to the wild state.
Fledging: the process by which a young bird acquires its first covering of feathers; hence **fledgling**–a young bird recently fledged.

Gape: produced by a bird opening its beak.
Genus: taxonomic grouping of birds having a common ancestor.
Guano: dung or excrement.

Hen: general term for the female bird. More specific terms are used for some species, eg greyhen (female Black Grouse), reeve (female Ruff).
High Arctic: the true Arctic, where the ground is permanently frozen and there are no trees.

Immature: after a young bird leaves the nest in juvenile plumage, which can last varying lengths of time, there follows a complete or partial moult into immature plumage. This persists until the attainment of full adult plumage.

Lek: communal display ground used by some species (see page 168, the Ruff).

Metabolism: the chemical changes which take place constantly in the cells and tissues of the body.
Moult: the periodic loss and replacement of plumage. The term also used to denote the time of year when birds are in the process of moulting.

Nuptial: pertaining to the breeding season, e.g. "nuptial finery" used to describe the male bird's breeding plumage.

Passerine: a member of the huge order *Passeriformes*, which includes more than half the known bird species. Often referred to as the perching birds since the order is characterized by foot structure adapted for efficient gripping.
Pelagic: species which spend the greater part of their time at sea, far from land.

Phase: also **morph**. Denotes a particular form of the species where a colour variation exists, eg dark phase, grey phase.
Polygamy: the formation of a sexual bond between one male and more than one female.
Primaries: those main flight feathers attached to the "hand" bones and forming the outer section of the wing.

Recurved: bent upwards.
Resident: non-migratory; some resident species do undertake localized movements or longer, seasonal journeys within Europe.
Ringing: the marking of individual birds, by the application of an identifiable ring on the leg, to facilitate the recording of population movements. A variation is the clip, applied to the wing, and commonly used to mark ducks.
Roosting: the bird is said to be roosting when either actually sleeping or resting for more than a brief nap.
Rufous: reddish-brown.

Scapulars: feathers above shoulder.
Secondaries: feathers attached to the "forearm" and forming the inner section of the wing.
Sedentary: resident, but scarcely moving from the immediate vicinity of the birthplace.
Sub-adult: young bird, with a mixture of immature and adult plumage; the last stage before full adult plumage.
Subarctic: superficially Arctic regions (not necessarily within the Arctic circle) where the ground is not permanently frozen and which can support small trees.

Taiga: coniferous forest land, lying south of tundra.
Tarsal bones: those bones comprising the "ankle".
Taxonomy: the science of classification.
Tundra: vast, treeless regions which make up most of N Russia, with arctic climate and vegetation.

Vagrant: a definition of scarcity applied to birds which leave their normal range to make infrequent visits to the area in question.
Vermiculation: irregular, wavy marking, reminiscent of tracks made by worms.
Vinaceous: wine coloured.

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KEY TO THE ILLUSTRATION PANEL

Common name of species: traditional (scientific) classification is unnecessary for bird recognition. Instead, birds are grouped by their resemblance to one another. Species most easily confused are placed on facing pages for easy comparison. Flick through the book to find a species which looks something like the unidentified bird; not many pages away will be the bird itself. A checklist of scientific names appears on pages 256-7

At least one profile of every bird is painted to a marked scale. This standard illustration shows the bird in a characteristic pose. In most cases there is also a flight illustration to a smaller specified scale

A full explanation of the symbols appears on page 12. When two species occur on the same page, their habitat preferences and status are usually identical. Status, however, may differ, and the second status symbol added to the end of the row refers to the latter species in the page headline

The Great Tit's distinctive "teechah . . . teechah" song is a welcome sign that spring has begun. It is common over most of Europe in woodland, agricultural and urban surroundings and has benefited from association with Man. Great Tits are the prime users of nestboxes, choosing them even where natural cavities are plentiful. They regularly visit gardens and show the strongest predilection for peanuts of all tits except the Marsh Tit. Bird tables are preferred to suspended food: Great Tits are less acrobatic than smaller tits. Such provisions are less useful at nesting time, for the young must be fed on insects. One woodland oak may provide as much food (especially weavils) as several gardens, where broods are generally smaller and less successful.

Clutch sizes average between nine and ten in woodland, and, in common with other tits, the eggs are buried in nest material when the female leaves the nest – a puzzling habit for a hole nester. Females are bold in defence of the nest, and males use the black belly stripe when trying to appear larger in territorial disputes. Great Tits have an extensive vocabulary: more than 80 different calls are recorded.

Over much of Europe, severe weather forces Great Tits to move west or southwest in winter, although in Britain this rarely occurs. This is a species which irrupts when numbers reach too high a level after a series of mild winters and good breeding.

Courtship, breeding and other displays comprise specific behaviour patterns, usually very conspicuous in the field, and their most obvious forms are widely illustrated

Behaviour alone is so often the key to identifying a bird that the majority of illustrations on each plate is devoted to portraying the most characteristic habits of the species

Every important variation in the appearance of the species is included, whether between male and female; adult, immature or juvenile; geographical race or stage of moult

Flocking habits, flock size and flock shape are clues, sometimes conclusive, to the identity of most species

When a bird is known for some special ability or physical adaptation, this is illustrated

Behaviour on the ground can reveal a bird's identity. Some species which have an unusual appearance when seen head-on are specially illustrated in this view. Useful identification features revealed only in flight are also shown

Size is one of the essential clues to a bird's identity. Each standing silhouette has been drawn to the same scale as a House Sparrow for comparison. With experience, a flight silhouette can be used as a primary recognition point

The main text describes the bird's natural history, breeding habits and survival prospects

DISTRIBUTION MAP

- Resident all year
- Summer quarters
- Winter quarters

THE ORANGE BAND

- Months during which bird is not present
- Months during which bird is present but not breeding
- Months during which bird is present and breeding

Note: the orange band shows the earliest usual date a bird may arrive and commence breeding in Europe; similarly it shows the latest usual date for the end of the breeding period and departure. The farther north, the later the event; the farther south, the earlier the event. In northern Sweden, for example, a Swallow arrives from Africa on June 1; in northern Spain, the same species arrives as early as March 15

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